VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the **reissuance** of the VPDES permit listed below. This permit is being processed as a **Minor, Municipal** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et.seq. The discharge results from the operation of a 0.63 MGD WWTP consisting of: Bar screen, influent pump station, aerated grit channel, three-channel oxidation ditch, dual secondary clarifiers, chlorination/dechlorination facilities, post aeration facilities, ultrasonic effluent flow meter, aerobic sludge digester units, solids dewatering building with belt filter press, sludge drying beds, and testing laboratory. Final sludge disposal is discussed in item 10. below. This permit action consists of limiting pH, BOD_5, suspended solids, total residual chlorine, E.coli, ammonia nitrogen, and dissolved oxygen; and including special conditions regarding compliance reporting, control of significant dischargers, sludge management, and other requirements and special conditions. The permit conditions and effluent limitations and monitoring requirements are being tiered for the existing design flow of 0.63 MGD and for the future design flow of 0.95 MGD. SIC Code: 4952.

1. Facility Name and Address:
Hall Creek Wastewater Treatment Plant
32430 Lee Highway
Glade Spring, VA 24340

2. **Permit No. VA0087378**
Existing Permit Expiration Date: May 6, 2012

2. **Owner Name and Address:**
Washington County Service Authority
25122 Regal Drive
P.O. Box 1447
Abingdon, VA 24212-1447

Owner Contact: Name: Robert C.H. Cornett
Title: General Manager
Telephone No: 276-628-7151

Facility Contact: Name: Tommy Dale Dotson
Title: Wastewater Manager
Telephone No: 276-944-4391 or 944-4381

4. Application Complete Date: November 8, 2011
Permit Drafted By: Fred M. Wyatt Date: December 8, 2011
Southwest Regional Office
Reviewed By: Steve E. Auth Date:
Public Comment Period Dates: from _____ to _____

5. Receiving Stream Name: Hall Creek; River Mile: 6CHAL000.82 Basin: Tennessee-Big Sandy River; Subbasin: Holston River; Section: 5a; Class: IV; Special Standards: None

6. 1-Day, 10-Year Low Flow (1Q10): 1.09 (June - Dec.)
1Q10 High Flow: 1.59 MGD (Jan. - May)
7-Day, 10-Year Low Flow (7Q10): 1.28 MGD (June - Dec.)
7Q10 High Flow: 1.92 MGD (Jan. - May)
30-Day, 10-Year Low Flow (30Q10): 1.39 MGD (June - Dec.)

30Q10 High Flow: 2.55 MGD (Jan. - May)
Harmonic Mean Flow (HM): 3.4 MGD

Tidal? NO

On 303(d) list? Yes (See Item # 13 below)

6. Operator License Requirements: Class II

7. Reliability Class: I

8. Permit Characterization:
( ) Private ( ) Federal ( ) State (X) POTW ( ) PVOTW
( ) Possible Interstate Effect ( ) Interim Limits in Other Document

9. Attach a schematic of wastewater treatment system, and provide a general description of the activities of the facility.

Discharge Description

OUTFALL NUMBER	DISCHARGE SOURCE (1)	TREATMENT (2)	FLOW (3)
001	Emory-Meadowview Area, Town of Glade Spring, Exit 22 Industrial Park, Abingdon Regional Jail	See Page 1 above, first paragraph	Existing - 0.63 MGD; Proposed - 0.95 MGD

(1) List operations contributing to flow (2) List treatment units
(3) Design flow

10. Sewage Sludge Use or Disposal: The sludge is stabilized in the aerobic digesters for a period of time ranging from 40 days at 20 degree C to 60 days at 15 degrees C to achieve a minimum 38% reduction in volatile solids. Polymer is added to the digested sludge before application to the drying beds or other mechanical means of dewatering belt filter press presently being installed. The sludge disposal plan consists of two options: (1) Shipment of the stabilized and dewatered sludge to the BFI Carter Valley Landfill in Hawkins County, Tennessee; (2) Shipment of the stabilized and dewatered sludge to Town of Abingdon Wolf Creek Water Reclamation Facility.

11. Discharge Location Description: See attached Glade Spring, VA Quadrangle; Number: 057D

12. Material Storage: None reported

13. Ambient Water Quality Information: The following tributaries to Middle Fork Holston River are listed as impaired: Hutton Creek, Hall Creek, Byers Creek and their tributaries (Cedar Creek, West Fork Cedar Creek, East Fork Cedar Creek, Plum Creek, unnamed tributary to Hutton Creek, unnamed tributary to Hall Creek and Tattle Branch. The tributaries are not supporting the recreation use goal. The impairment is listed as

Escherichia coli (E.coli) and fecal coliform. These tributaries are also not supporting the aquatic life use goal. The impairment is benthic-macroinvertebrate caused by sedimentation/siltation. The sources of both impairments are animal feeding operations (NPS), crop production, grazing in riparian or shoreline zones, livestock (grazing or feeding operations), and unrestricted cattle access to streams.

1) A total maximum daily load (TMDL) of sediment was developed to address benthic impairments in the Hall Creek watershed and was approved by the Environmental Protection Agency on 0/28/2004. It can be found at the following website: http://www.deq.virginia.gov/tmdl/apptmdls/tenbigrvr/mfholbc.pdf. DEQ will revise the sediment TMDL to accommodate changes to the original TMDL accounting used to calculate the Hall Creek water quality TMDL allocations for TSS. 2) The TMDL for fecal coliform was approved on 02/02/2001 and can be found at the following website: http://www.deq.virginia.gov/tmdl/apptmdls/tenbigrvr/mfholstn.pdf. The bacteria and sediment TMDLs will be changed to accommodate a flow discharge rate of 0.95 MGD. In addition, due to water quality standards updates, the bacteria allocation for fecal coliform will be converted to E.coli.

DEQ will modify the sediment wasteload allocation and TMDL to accommodate this increased discharge at a permitted monthly average total suspended solids (tss) concentration of 30 mg/L at an annual loading of approximately 43.34 tons/year. DEQ will modify the bacterial wasteload allocation at a permitted geometric mean E.coli concentration of 126 cfu, at an annual loading of approximately 6.20E+13 cfu/year.

14. Antidegradation Review & Comments: Tier I (X) Tier II Tier III

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters. The antidegradation review begins with a Tier determination. The receiving stream is Tier I, since the original effluent limitations for the 0.63 MGD facility were based on stream standards.

15. Site Inspection: Technical Inspection on June 7, 2011 by Danny L. Patty.

16. Effluent Screening & Limitation Development: The effluent limitations for the existing 0.63 MGD facility have not been re-evaluated. BOD_5 and dissolved oxygen effluent limitations for the 0.95 MGD expansion have been calculated, using Version 4.10 (Streeter Phelps) Regional Model for

Free Flowing Stream. The effluent limitations for ammonia nitrogen for the expanded flow have been calculated using STATS.EXE Version 2.0.4, current Virginia ammonia water quality criteria, and recent downstream Storet pH data.

Basis for Effluent Limitations: 0.63 MGD

PARAMETER	BASIS FOR LIMITS *	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
Flow	NA	NL	NA	NA	NL	Continuous	Totalizing Indicating Recording
PH	2	NA	NA	6.0 SU	9.0 SU	1/Day	Grab
BOD_5	1,4	30 mg/l 72 kg/d	45 mg/l 110 kg/d	NA	NA	1 Day/Week	8 Hour Composite
Total Suspended Solids	1	30 mg/l 72 kg/d	45 mg/l 110 kg/d	NA	NA	1 Day/Week	8 Hour Composite
Ammonia Nitrogen (June-Dec.)	2,5	3.6 mg/l	3.6 mg/l	NA	NA	1 Day/Week	8 Hour Composite
Ammonia Nitrogen (Jan.-May)	2,5	4.4 mg/l	4.4 mg/l	NA	NA	1 Day/Week	8 Hour Composite
Total Residual Chlorine**	2,5	0.024 mg/l	0.029 mg/l	NA	NA	3/Day @ 4 Hour Intervals	Grab
E.coli (n/100 ml)	2	126 Geometric Mean	NA	NA	NA	1/Week Between 10:00 am & 4:00 pm	Grab
Dissolved Oxygen	2,5	NA	NA	6.5	NA	1/Day	Grab

Basis for Effluent Limitations: 0.95 MGD

PARAMETER	BASIS FOR LIMITS *	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		MONTHLY AVERAGE	WEEKLY AVERAGE	MINIMUM	MAXIMUM	FREQUENCY	SAMPLE TYPE
Flow	NA	NL	NA	NA	NL	Continuous	Totalizing Indicating Recording
PH	2	NA	NA	6.0 SU	9.0 SU	1/Day	Grab
BOD_5	1,4	30 mg/l 110 kg/d	45 mg/l 160 kg/d	NA	NA	1 Day/Week	8 Hour Composite
Total Suspended Solids	1	30 mg/l 110 kg/d	45 mg/l 160 kg/d	NA	NA	1 Day/Week	8 Hour Composite
Ammonia Nitrogen (June-Dec.)	2,5	3.8 mg/l	5.2 mg/l	NA	NA	3 Days/Week	8 Hour Composite
Ammonia Nitrogen (Jan.-May)	2,5	7.2 mg/l	9.7 mg/l	NA	NA	3 Days/Week	8 Hour Composite
Total Residual Chlorine**	2,5	0.017 mg/l	0.02 mg/l	NA	NA	3/Day @ 4 Hour Intervals	Grab
E.coli (n/100 ml)	2	126 Geometric Mean	NA	NA	NA	1/Week Between 10:00 am & 4:00 pm	Grab
Dissolved Oxygen	2,5	NA	NA	6.5	NA	1/Day	Grab

*1. Federal Effluent guidelines
2. Water Quality-based Limits:
3. Best Engineering Judgment
4. Best Professional Judgement
5. Other (e.g. wasteload allocation model)

****Additional TRC Limitations and Monitoring Requirements (PART I.B. of Permit)**

1. The permittee shall monitor the Total Residual Chlorine (TRC) at the outlet of each operating chlorine contact tank, 3/day at 4 hour intervals.
2. No more than nine (9) of all samples for TRC taken at the outlet of each chlorine contact tank shall be less than 1.0mg/l for any one calendar month.
3. No TRC sample collected at each outlet of the chlorine contact tank shall be less than 0.6 mg/l.
4. If dechlorination facilities exist, the samples above shall be collected prior to dechlorination.
5. If chlorine disinfection is not used, E.coli shall be limited and monitored by the permittee as specified below and this requirement, if applicable, shall substitute for the TRC and E.coli requirement delineated elsewhere in Part I of this permit:

	Discharge Limitations		Monitoring Requirements	
	Monthly Avg.	Weekly Avg.	Frequency	Sample Type
E.coli (N/100ml)	126*	NA	3 Days/Week**	Grab

* Geometric Mean

** Between 10:00 a.m. and 4:00 p.m.

17. Basis for Sludge Use & Disposal Requirements: The VPDES Permit Regulation (9 VAC 25-31-10 et seq.), adopted by the State Water Control Board May 22, 1996, became effective on July 24, 1996. Among other program changes, the newly adopted regulation incorporated technical standards for the use or disposal of sewage sludge.

18. Antibacksliding Statement: The effluent limitations for the existing 0.63 MGD design flow are not being relaxed in this reissuance. The ammonia nitrogen effluent limitations for the expansion design flow (0.95 MGD) are less stringent than those for the 0.63 MGD facility, based on new downstream pH data. Therefore, the anti-backsliding provisions of (9 VAC 25-31-220.1) have not been violated.

19. Compliance Schedule: NA

20. Special Conditions:

PART I.B. Additional TRC Limitations and Monitoring Requirements
Rationale: Required by Sewage Collection and Treatment Regulations, 9VAC 25-790. Also, 40 CFR 122.41(e) requires the permittee, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. This ensures proper operation of chlorination equipment to maintain adequate disinfection.

PART I.C. Compliance Reporting
Rationale: Authorized by VPDES Permit Regulation, 9VAC25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

PART I.D. Special Condition - Control of Significant Dischargers
Rationale: VPDES Permit Regulation, 9VAC25-31-730 through 900, and 40 CFR part 403 require certain existing and new sources of pollution to meet specified regulations.

PART I.E. Other requirements and Special Conditions

1. **95% Capacity Reopener**
Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 4 for all POTW and PVOTW permits

2. **Indirect Dischargers**
Rationale: Required by VPDES Permit Regulation, 9VAC25-31-200 B 1 and B 2 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

3. **CTC, CTO Requirement**
Rationale: Required by the Code of Virginia § 62.1-44.19: Sewage Collection and Treatment Regulations, 9VAC 25-790; VPDES Permit Regulation, 9VAC25-31-190E.

4. **Operation and Maintenance Manual Requirement**
Rationale: Required by the Code of Virginia § 62.1-44.19: Sewage Collection and Treatment Regulations, 9VAC25-790; VPDES Permit Regulation, 9VAC25-31-190 E.

5. **Licensed Operator Requirement**
Rationale: The VPDES Permit Regulation, 9VAC25-31-200 C and the Code of Virginia § 54.1-2300 et seq, Rules and Regulations for Waterworks and Wastewater Works Operators (18VAC160-20-10 et seq.), require licensure of operators.

6. **Reliability Class**
Rationale: Required by the Sewage Collection and Treatment Regulations, 9 VAC25-790 for all municipal facilities.

7. **Treatment Works Closure Plan**
Rationale: State Water Control Law § 62.1-44.19. This condition is used to notify the owner of the need for a closure plan where a treatment works is being replaced or is expected to close.

8. **Section 303(d) List (TMDL) Reopener**
Rationale: Section 303(d) of the Clean Water Act requires the total maximum daily loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it in compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1)of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in the permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

9. **Sludge Reopener**
Rationale: Required by VPDES Permit Regulation, 9VAC25-31-220 C for all permits issued to treatment works treating domestic sewage.

10. **Sludge Use and Disposal**
Rationale: VPDES Permit Regulation, 9VAC25-31-100 P; 220 B.2.; and 420 through 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal.

11. **Water Quality Criteria Monitoring**
Rationale: State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.

PART II, Conditions Applicable to All Permits

Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. Changes from the previous permit contained in the reissuance permit:

The $CBOB_5$ limits for the existing 0.63 MGD facility are being changed to equivalent BOB_5 limits. An effluent limitations and monitoring requirements tier is being added for the proposed 0.95 MGD expansion. All permit language and special conditions have been updated. Water quality criteria effluent monitoring requirements and Attachment A have been added for the 0.95 MGD expansion. Since this facility discharges into a stream that has an approved bacterial TMDL, E.coli monitoring requirements have been added in accordance with EPA mandates.

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	$CBOD_5$, Mo. ave.			25 mg/l, 60 kg/d	Deleted	Changed to equivalent BOD_5 limits	05/07/2012
001	$CBOD_5$, Wk. ave.			38 mg/l, 89 kg/d	Deleted	Changed to equivalent BOD_5 limits	05/07/2012
001	BOD_5, mo. ave.			No limit	30 mg/l, 72 kg/d	$CBOD_5$ limits changed to BOD_5 limits	05/07/2012
001	BOD_5, wk. ave.			No limit	45 mg/l, 110 kg/d	$CBOD_5$ limits changed to BOD_5 limits	05/07/2012
001	Total Residual Chlorine	1/Day	3/Day @ 4 Hr. Interval			Permit manual guidance	05/07/2012
001	E.coli		1/Week		126 N /100 ml	EPA mandate	05/07/2012
Special Condition Changes: See paragraph below							

22. Variances/Alternate Limits or Conditions: None

23. Regulation of Users: 9 VAC 25-31-280 B 9 - NA

24. Public Notice Information required by 9 VAC 25-31-280 B:

All pertinent information is on file and may be inspected, and copied by contacting Fred M. Wyatt, Department of Environmental Quality, Southwest Regional Office, P.O. Box 1688, Abingdon, VA 24212. Telephone: (276) 676-4810 E-mail: frederick.wyatt@deq.virginia.gov

Persons may comment in writing or by email to the DEQ on the proposed permit action, and may request a public hearing, during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the DEQ Southwest Regional Office by appointment.

25. Additional Comments:

Previous Board Action: None

Staff Comments:

Permit History: VPDES Permit No.VA0087378 was issued on May 6, 1992, was reissued three times, and has an expiration date of May 6, 2012.

Application Waivers: The permittee has requested and the staff is granting a waiver for the following information in application Form 2A:

PART A.12 - fecal coliform.

PART B.6., EFFLUENT TESTING DATA: Total Kjeldahl Nitrogen, nitrate plus nitrite nitrogen, oil and grease, total phosphorus, and total dissolved solids.

The rationale for granting these waivers is that the existing VPDES permit does not require testing of these parameters and that the parameters in the existing permit are sufficient for the protection of water quality.

Permit Fee: A permit fee is not required. Only an annual maintenence fee of $2,461 is required, to be paid by October 1 of each year.

Threatened or Endangered Species: According to the attached printout from the Virginia Fish and Wildlife Information Service, no T&E species have been confirmed in Hall Creek. The following habitat is predicted in Hall Creek for the following WAP Tier I & II Species: Fish - (SE) Tennessee Dace (Chrosomus tennesseenis); Mussels - (FS) Tennessee Pigtoe (Fusconaia barnesiana, (SE) Tennessee Heelsplitter (Lasmigona holstonia),

(FCST) Slabside Pearlymussel (Lexingtonia dolabelloides), (FC) Fluted Kidneyshell (Ptychobranchus subtentum.

Public Comments:

Prior to publication of the public notice, riparian landowners were notified, as required by Section 62.1-44.15:4 of the Code of Virginia for new or expanded wastewater treatment facilities.

26. TMDL: See # 13 above

PLANNING CONCURRENCE FOR MUNICIPAL VPDES PERMIT

PERMIT NO. VA0087378

FACILITY: Hall Creek WWTP

COUNTY: Washington

[ ] 1. The discharge is in conformance with the existing planning documents for the area.

[ ] 2. The discharge is not addressed in any planning document but will be included, if required, when the plan is updated.

[ ] 3. Other

_____

Environmental Manager

_____

Date

ATTACHMENT 1

Treatment Facilities Description & Location

RECEIVED
JAN 24 1997
DEQ - SWRO

COMMONWEALTH of VIRGINIA

RANDOLPH L. GORDON, M.D., M.P.H.
Commissioner

Department of Health
Office of Water Programs
Environmental Engineering Field Office

454 East Main Street
P. O. Box 1985
Abingdon, VA 24212-1985
PHONE: (540) 628-5161
FAX No. (540) 628-1634

January 21, 1997

SUBJECT: Washington County
Sewerage - Emory-Meadowview

Mr. Fred M. Wyatt
Environmental Engineer Senior
Department of Environmental Quality
P.O. Box 1688
Abingdon, Virginia 24212

Dear Mr. Wyatt:

This office has completed review of the pertinent pages of the subject draft permit VA0087378 reissuance and the documents were found to be adequate.

We concur with the Class III Reliability and Class III licensed operator requirement for the 0.25 MGD treatment works proposed in your memorandum dated January 10, 1997.

The *Sewerage Regulations* indicate that treatment works which exceed 0.5 MGD using suspended growth biological treatment processes are Class II facilities. Therefore, a Class II licensed operator is recommended for the 0.63 MGD treatment works.

An increase in the amount of time the 0.63 MGD treatment works will be required to be manned is also indicated by the *Sewerage Regulations*. The existing 0.25 MGD facility is required to be manned 8 hours per day. The regulations call for a 0.63 MGD treatment works to be manned 16 hours per day.

Finally, we have reconsidered previous recommendations for the reliability classification for the 0.63 MGD treatment works and are recommending Reliability Class I. This recommendation is based on the proximity of the discharge to the Washington County Service Authority water treatment plant intake located approximately 10 miles downstream. The dilution ratio of the 0.63 MGD discharge with the one day low flow in 30 years (1Q30 = 21.67 MGD) of the receiving stream at the water treatment plant intake will be approximately 34.4 to 1.

SUBJECT: Washington County
Sewerage - Emory-Meadowview

The Class II operator and Class I Reliability requirements will necessitate an Operation and Maintenance Manual amendment.

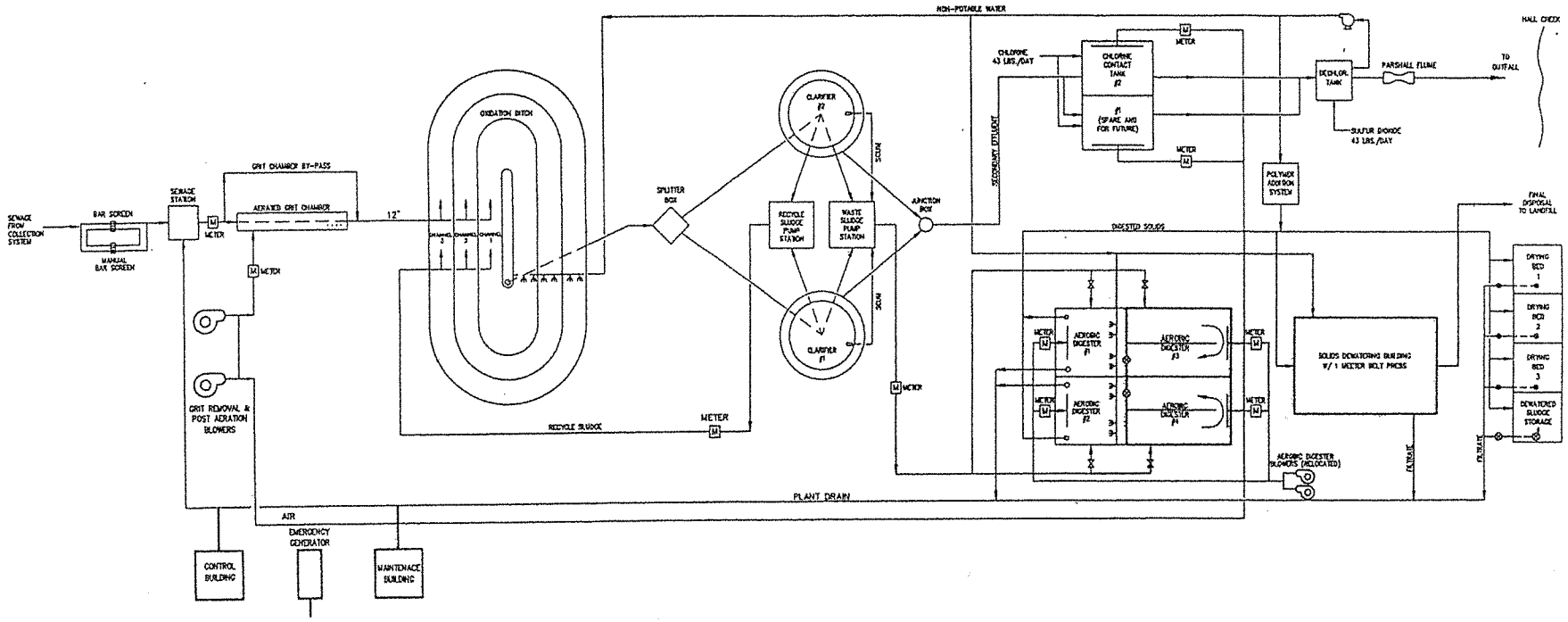
If we can be of any further assistance, please call.

Sincerely,

for G. W. Peaks, P.E.
Engineering Field Director
Abingdon Field Office

ERH/bhc

cc: VDH - Richmond



*DRAWING FROM DAA, SCHEMATIC WASTEWATER FLOW HALL CREEK WASTEWATER TREATMENT FACILITY, WASHINGTON COUNTY, VIRGINIA, 11/30/2006

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CHA
1115 South Main Street - Blacksburg, VA 24060-5644
Metro (540) 552-5644 - www.chacompanies.com

HALL CREEK WASTEWATER TREATMENT PLANT
WASHINGTON COUNTY, VIRGINIA
PROCESS FLOW SCHEMATIC

PROJECT NO. 23354
DATE: OCT 2011
FIGURE 2

File: V:\PROJECTS\BVA\23354\CADD\FIGURES\FIGURE 2.DWG Saved: 10/20/2011 1:18:22 PM Plotted: 10/20/2011 1:16:34 PM User: Hodge, Chris LastSavedBy 3771

CAPACITY

Average Daily Design Capacity	0.63 MGD
Maximum Design Capacity	1.56 MGD

INFLUENT WASTEWATER CHARACTERISTICS

BOD5/TSS	250/250 mg/l
Ammonia	30 mg/l
Minimum Temperature	15 deg. C
Maximum Temperature	15 deg. C

EFFLUENT LIMITS

BOD5/TSS		25/30 mg/l
Ammonia	April 1 thru October 31	3.6 mg/l weekly avg.
	November 1 thru March 31	4.4 mg/l weekly avg.
Dissolved Oxygen		6.5 mg/l
Fecal Coliform		200 per 100 ml
Total Residual Chlorine		1.o mg/l
pH		60. to 9.0

SCREENING DEVICES

A. MECHANICAL BAR SCREEN

Rack Width	2'
Clear Openings	1"

B. MANUAL BAR SCREEN

Rack Width	2'
Clear Openings	1 1/2"

SEWAGE PUMP STATION

Number of Pumping Units	2 variable speed
Capacity per Pump Initial	87 to 547 gpm
Modifications for Future	1 additional constant speed pump @ 547 gpm

AERATED GRIT CHAMBER

Detention Time at 0.63 MGD	4 minutes
Air Supply Rate	4 SCFM/linear foot

OXIDATION DITCH

Number of Channels	3
Liquid Depth in Channel	10'
Channel Width	10.5'
Volume (Channels 1,2,)	294,134 gallons
Volume (Channels 1,2,3)	526,329 gallons
Aeration Time	20.1 hrs.
Sludge Age	21.8 days
Sludge Production Rate, Initial	202 lbs/day (560 lbs/day future)
BOD5 Loading	18.67 lb/1000 ft^3/day
MLSS	4,500 mg/l
Number of Aeration Disks Per Channel, 1/2/3	22/32/44
Design Oxygen Delivery	1.08 lbs/hr–disk
Maximum Oxygen Delivery	2.64 lbs/hr–disk
Aeration Disk Submergence, Design	15"
Aeration Disk Submergence, Maximum	21"
Aeration Disk Drives	2–25 HP and 4–10 HP
Total Connected Horsepower	90 HP

SECONDARY CLARIFIERS

Number of Units	2
Diameter	48'
Sidewall Depth	12'
Weir Loading Rate	2,089 gpd/ft
Hydraulic Loading Rate	348 gpd/ft
Solids Loading Rate @ 0.63 MGD	0.52 lb/ft2
Solids Loading Rate @ 1.56 MGD	1.27 lb/ft2–hr
Detention Time	17 hrs (13 hrs future)
Underflow Solids Concentration	10,000 mg/l

RECYCLE ACTIVATED SLUDGE PUMP STATION

Number of Pumping Units	2 variable speed
Capacity per Pump, Initial	87 to 328 gpm
Capacity per Pump, Future	219 to 813 gpm

WASTE ACTIVATED SLUDGE/SCUM PUMP STATION

Number of Pumping Units	2 constant speed
Capacity per Pump	100 gpm @ 36.6 TDH, Shut Off Head = 46 FT

DISINFECTION

A. CHLORINATION

Design Cl2 Dosage Rate	105 lbs/day
Minimum Design Chlorine Concnetration	8 mg/l
Detention Time @ 0.63 MGD	55 minutes
Detention Time @ 1.56 MGD	22 minutes
Control System	flow proportioning

B. DECHLORINATION

Design SO2 Dosage Rate	105 lbs/day future

POST AERATION

Target Dissolved Oxygen	7.0 mg/l
Alpha	0.65
Beta	0.95
Design Efficiency	9%

TREATED EFFLUENT FLOWMETER

Parshall Flume Throat Width	9"
Minimum Flow Rate	0.06 MGD
Maximum Flow Rate	5.73 MGD

AEROBIC SLUDGE DIGESTION

Volume Required	126,000 gallons
Volume Provided	321,000 gallons
Volatile Solids Reduction	40%
Solids Retention Time, Initial	64 dcys
Digested Solids Production Rate	671 lbs/day

SLUDGE DRYING BEDS

Drying Bed Area, Initial	972 ft2 (2,916 ft2 future)
Solids Loading Rate	1.5 lb/ft2–week

DEWATERED SLUDGE STORAGE FACILITY

Storage Capacity @ 0.63 MGD	60 days production

GREY WATER SYSTEM

Number of Pumping Units	2
Capacity	75 gpm
Total Dynamic Head	60 feet

AEROBIC DIGESTER #3

GLASS-LINED STEEL BOLTED TANK

Diameter	56 ft
Height	15 ft
Maximum SWD	14 ft
Maximum Volume	258,000 gallons
Aeration/Mixing	1-50 HP Model CFSS "ENDURA SERIES" Aqua-Jet II Aerator

AEROBIC DIGESTERS #1 AND #2

Volume of Each	31,500 gallons

DIGESTER PUMP STATION

Number of Pumping Units	2- Constant Speed
Capacity per pump	100 gpm @

COMMONWEALTH OF VIRGINIA
RANDALL M. HANCOCK
No. 014541
PROFESSIONAL ENGINEER

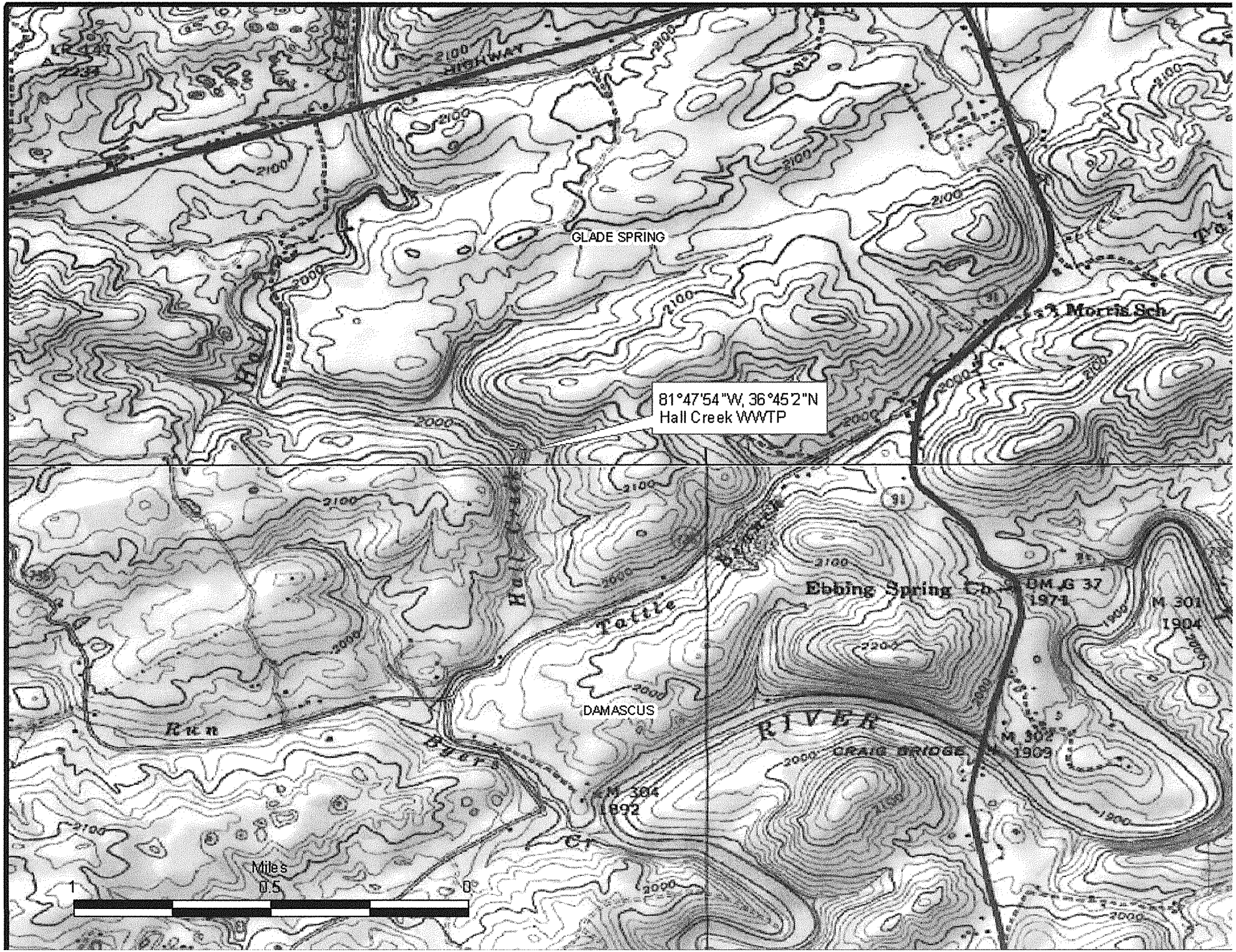
DRAFT

6772C1R.DWG

SCALE: NONE

C-1

PLAN № T-6772-05


GLADE SPRING
81°47'54"W, 36°45'2"N
Hall Creek WWTP
DAMASCUS
Ebbing Spring Ch
Tattle
RIVER
CRAIG BRIDGE
Miles
1
0.5
0

ATTACHMENT 2

Effluent Limits Calculations

MODEL FILE AND STREAM INSPECTION REPORT FORM

Discharge Name: Hall Creek WWTP Upgrade

Location: 32430 Lee Highway, Glade Spring, VA

Model File Path/Name: _____

Inspection Date: ___/___/___ **Modeler:** F. M. Wyatt

General Stream Information:

Stream Name: Hall Creek

Basin: Tenn-Big Sandy Riv Section: 5a Class: IV Special Standards: None

Are the standards for this stream violated due to natural causes? (Y/N) N

Is the stream correctly classified? (Y/N) Y

If "N", what is the correct classification? _____

Model Segmentation:

Number of segments to be modeled: 1

Flow Gauge / Flow Frequency Information (Attach Copy):

Gauge Used: Hall Creek near Emory, VA

Drainage Area/Observed Flow At The Gauge: 3.19 sq. mi./mgd

Drainage Area/Observed Flow At The Start of The Model: 9.59 sq. mi./mgd

7Q10 of the Gauge: 0.43 mgd

Flow Adjustment for Springs or Dischargers: _____ mgd

Background Water Quality:

Elevation at the Start of the model: 1964 ft above mean sea level

Elevation at the End of the model: 1880 ft above mean sea level

Critical Temperature: 18 °C (attach data and analysis)

Ambient Monitoring Gauge Used: Hall Creek Near Emory

Additional Discharges Information:

Is there a discharger within 3 miles upstream of the proposed discharge? (Y/N) N

Does antidegradation apply to this analysis? (Y/N) N If so, which segment(s)? _____

Is any segment on the current 303(d) list for D.O. violations? (Y/N) N

Is any segment of the model within an approved D.O. TMDL segment? (Y/N) N

Is any discharge to the model intermittent? (Y/N) N

Any dams in stream section being modeled? (Y/N) N

Notes/Sketch:

7Q10 = 1.28 MGD
HF7Q10 = 1.92 MGD

MODEL FILE AND STREAM INSPECTION REPORT FORM
Page 2

(Fill In This Page FOR EACH SEGMENT To Be Modeled)

Segment Number:		
Reason for Defining Segment:	Discharge at Beginning of Segment	X
	Physical Change at Beginning of Segment	
	Tributary at Beginning of Segment	

Length of Segment (mi.):	1.25
Drainage Area at Start of Segment (sq. mi.):	9.59
Drainage Area at End of Segment (sq. mi.):	14.75
Elevation at Start of Segment (ft.):	1964
Elevation at End of Segment (ft.):	1880

If Discharge or Tributary At Beginning of Segment, Complete the Following:

Discharge/Tributary Name:	Hall Creek WWTP	
Discharge/Tributary Temperature (C): (If different from background ambient)		22
Critical Discharge/Tributary Flow (mgd): (Design/Permitted Flow or 7Q10 Condition) (use permitted or design flow for discharges, 7Q10 flow from flow frequency analysis for tributaries)		0.95
For Dischargers Only: (use permitted Concentrations)	**$CBOD_5$ (mg/l):**	25
	TKN (mg/l):	6.8
	D.O. (mg/l):	6.5

General Type of Cross Section in Segment: (7Q10 Condition)

Rectangular ___ Triangular ___ Deep Narrow U ___ Wide Shallow Arc X Irregular ___ No Defined Channel ___

General Channel Characteristics of Segment: (7Q10 Condition)

Mostly Straight ___ Moderately Meandering X Severely Meandering ___ No Defined Channel ___

Does the stream have a pool and riffle character (Y/N)? (7Q10 Condition)			
If "Y":	% of length that is pools 50		Average depth of pools (ft) ____
	% of length that is riffles 50		Average depth of riffles (ft) ____
Bottom:	Sand ___ Silt ___ Gravel ___ Small Rock Y Large Rock ___ Boulders ___		
Sludge Deposits:	None X Trace ___ Light ___ Heavy ___		
Plants:	Rooted:	None X Few ___ Light ___ Heavy ___	
	Algae:	None Y Film on Edges Only ___ Film on Entire Bottom ___	

Projected 7Q10 Width of Segment (ft): (must be projected by modeler based on site visit)	
Projected 7Q10 Depth of Segment (ft): (can be calculated by model based on width)	
Projected 7Q10 Velocity of Segment (ft): (can be calculated by model based on width)	
Does the water have an evident green color? (Y/N)	

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to HALL CREEK.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	HALL CREEK WWTP
VPDES Permit No.:	

Discharger Flow Information

Flow:	0.95 MGD
cBOD5:	25 mg/l
TKN:	6.8 mg/l
D.O.:	6.5 mg/l
Temperature:	22 Degrees C

Geographic Information

Segment Length:	1.25 miles
Upstream Drainage Area:	9.59 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	1964 Ft.
Downstream Elevation:	1880 Ft.

Hydraulic Information

Segment Width:	10 Ft.
Segment Depth:	0.472 Ft.
Segment Velocity:	0.736 Ft./Sec.
Segment Flow:	2.243 MGD
Incremental Flow:	-1.293 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Moderately Meandering
Pool and Riffle:	Yes
Percent Pools:	50
Percent Riffles:	50
Pool Depth:	0.7 Ft.
Riffle Depth:	0.3 Ft.
Bottom Type:	Small Rock
Sludge:	None
Plants:	None
Algae:	None

REGIONAL MODELING SYSTEM VERSION 4.0

Model Input File for the Discharge to HALL CREEK.

File Information

File Name:	C:\Documents and Settings\fmwyatt\My Documents\FREDWORK\Bland
Date Modified:	December 08, 2011

Water Quality Standards Information

Stream Name:	HALL CREEK
River Basin:	Tennessee/Big Sandy Rivers Basin
Section:	5a
Class:	IV - Mountainous Zones Waters
Special Standards:	None

Background Flow Information

Gauge Used:	Hall Creek Near Emory
Gauge Drainage Area:	3.19 Sq.Mi.
Gauge 7Q10 Flow:	0.43 MGD
Headwater Drainage Area:	9.59 Sq.Mi.
Headwater 7Q10 Flow:	1.292696 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges:	0 MGD
Incremental Flow in Segments:	0.1347962 MGD/Sq.Mi.

Background Water Quality

Background Temperature:	18 Degrees C
Background cBOD5:	2 mg/l
Background TKN:	0 mg/l
Background D.O.:	7.924624 mg/l

Model Segmentation

Number of Segments:	1
Model Start Elevation:	1964 ft above MSL
Model End Elevation:	1880 ft above MSL

"Model Run For C:\Documents and Settings\fmwyatt\My Documents\FREDWORK\Bland WWTP-2011.mod On 12/8/2011 10:20:03 AM"

"Model is for HALL CREEK."
"Model starts at the HALL CREEK WWTP discharge."

"Background Data"

"7Q10"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
1.2927,	2,	0,	7.925,	18

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.95,	~~25~~,	~~6.8~~,	,6.5,	22

30 BOD5 3.8 mg/l-NH3-N

"Hydraulic Information for Segment 1"

"Length"	"Width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
1.25,	10,	.472,	.736

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"cBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
2.2427,	7.321,	29.357,	6.97,	8.534,	19.69439

"Rate Constants for Segment 1. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
1.2,	1.183,	20,	19.856,	.4,	.391,	0,	0

"Output for Segment 1"
"Segment starts at HALL CREEK WWTP"

"Total" "Dist."	"Segm." "Dist."	"DO"	"cBOD"	"nBOD"
"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	7.321,	29.357,	6.97
.1,	.1,	7.22,	29.07,	6.947
.2,	.2,	7.137,	28.786,	6.924
.3,	.3,	7.069,	28.505,	6.902
.4,	.4,	7.014,	28.226,	6.88
.5,	.5,	6.97,	27.95,	6.858
.6,	.6,	6.935,	27.677,	6.836
.7,	.7,	6.908,	27.406,	6.814
.8,	.8,	6.888,	27.138,	6.792
.9,	.9,	6.873,	26.873,	6.77
1,	1,	6.863,	26.61,	6.748
1.1,	1.1,	6.857,	26.35,	6.726
1.2,	1.2,	6.854,	26.092,	6.704
1.25,	1.25,	6.854,	25.964,	6.693

"END OF FILE"

"***SEASONAL RUN***"
"Wet Season is from January to May."
"Model Run For C:\Documents and Settings\fmwyatt\My Documents\FREDWORK\Bland WWTP-2011.mod On 12/8/2011 11:00:29 AM"

"Model is for HALL CREEK."
"Model starts at the HALL CREEK WWTP discharge."

"Background Data"
"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
1.924, 2, 0, 7.925, 18

"Discharge/Tributary Input Data for Segment 1"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.95, ~~25~~ 30 BOD5, ~~10.2~~ 7.2 mg/l NH3-N, 6.5, 20
"Hydraulic Information for Segment 1"
"Length","Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
1.25, 10, .6195923, .7177091

"Initial Mix Values for Segment 1"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
2.874, 7.454, 24.007, 10.305, 8.705, 18.6611

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, .658, 20, 19.375, .25, .226, 0, 0

"Output for Segment 1"
"Segment starts at HALL CREEK WWTP"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.454, 24.007, 10.305
.1, .1, 7.502, 23.873, 10.285
.2, .2, 7.544, 23.74, 10.265
.3, .3, 7.58, 23.607, 10.245
.4, .4, 7.611, 23.475, 10.225
.5, .5, 7.638, 23.344, 10.205
.6, .6, 7.662, 23.214, 10.185
.7, .7, 7.683, 23.084, 10.165
.8, .8, 7.702, 22.955, 10.145
.9, .9, 7.718, 22.827, 10.126
1, 1, 7.733, 22.699, 10.107
1.1, 1.1, 7.746, 22.572, 10.088
1.2, 1.2, 7.758, 22.446, 10.069
1.25, 1.25, 7.763, 22.383, 10.059

"END OF FILE"

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
Water Quality Assessments and Planning
629 E. Main Street P.O. Box 10009 Richmond, Virginia 23240

SUBJECT: Flow Frequency Determination
Emory-Meadowview WWTP - #VA0087378

TO: Fred Wyatt, SWRO

FROM: Paul E. Herman, P.E., WQAP

DATE: December 5, 2001

COPIES: Jon van Soestbergen, M. Dale Phillips, File

This memo supersedes my June 28, 1996, memo to you concerning the subject VPDES permit.

The Emory-Meadowview WWTP discharges to the Hall Creek near Glade Spring, VA. Stream flow frequencies are required at this site by the permit writer for the purpose of calculating effluent limitations for the VPDES permit.

The VDEQ has made site specific flow measurements on the Hall Creek from 1994 to 1997. The measurements were made upstream of the Patrick Henry High School STP (now off-line) near Emory, VA. The measurements were correlated with the same day daily mean values from two continuous record gages; one on the Middle Fork Holston River near Meadowview, VA #03475000 and the second on the Beaver Creek at Bristol, VA #03478400. The measurements and daily mean values were plotted on a logarithmic graph and a best fit line was drawn through the data points. The required flow frequencies from each reference gage were plugged into the equation for the regression line and the associated flow frequencies at the measurement site were calculated. An average of the resulting values was assigned to the measurement site. The flow frequencies at the discharge point were determined by using the values at the measurement site and adjusting them by proportional drainage areas. The data for the reference gages, the measurement site and the discharge point are presented below:

M.F. Holston River near Meadowview, VA (#03475000):

Drainage Area = 211 mi^2

1Q10 = 38.7 cfs	High Flow 1Q10 = 58.9 cfs
7Q10 = 48.8 cfs	High Flow 7Q10 = 72.7 cfs
30Q5 = 58.8 cfs	HM = 134 cfs

Annual Average = 255 cfs

Beaver Creek at Bristol, VA (#03478400):

Drainage Area = 27.7 mi^2

1Q10 = 8.02 cfs	High Flow 1Q10 = 11.3 cfs
7Q10 = 8.63 cfs	High Flow 7Q10 = 13.3 cfs
30Q5 = 10.1 cfs	HM = 22.5 cfs

Annual Average = 34.7 cfs

The high flow months are January through May.

Hall Creek near Emory, VA (#03474740):

Drainage Area = 3.19 mi^2

1Q10 = 0.56 cfs — High Flow 1Q10 = 0.82 cfs

7Q10 = 0.66 cfs = 0.43 MGD — High Flow 7Q10 = 0.99 cfs = 0.64 MGD

30Q5 = 0.78 cfs — HM = 1.75 cfs

Annual Average = 3.07 cfs

Hall Creek at discharge point:

Drainage Area = 9.59 mi^2

1Q10 = 1.68 cfs (1.09 mgd) — High Flow 1Q10 = 2.47 cfs (1.59 mgd)

7Q10 = 1.98 cfs (1.28 mgd) — High Flow 7Q10 = 2.98 cfs (1.92 mgd)

30Q5 = 2.34 cfs (1.52 mgd) — HM = 5.26 cfs (3.40 mgd)

Annual Average = 9.23 cfs (5.96 mgd)

30Q10 = 1.39 mgd — HF30Q10 = 2.55 mgd

This analysis does not account for any discharges, withdrawals or springs influencing the flow in the Hall Creek between the measurement site and the discharge point. If there are any questions concerning this analysis, please let me know.

M.F. Holston River Near Meadowview

DA = 211 mi.²

1Q10 = 17 cfs
HF1Q10 = 39 cfs
7Q10 = 43 cfs
HF7Q10 = 61 cfs
30Q10 = 50 cfs
HF30Q10 = 94 cfs

Beaver Creek at Bristol

DA = 27.7 mi.²
1Q10 = 7.9 cfs
HF1Q10 = 10 cfs
7Q10 = 8.4 cfs
HF7Q10 = 12 cfs
30Q10 = 9.2 cfs
HF30Q10 = 16 cfs

$\frac{30Q10}{7Q10} = \frac{9.2}{8.4} = 1.09$

$\frac{HF\ 30Q10}{HF\ 7Q10} = \frac{16}{12} = 1.33$

Hall Creek at Discharg

30Q10 = 7Q10 * 1.09 mgd
" = 1.28 * 1.09 m
" = 1.39 mgd

HF30Q10 = HF7Q10 * 1.33 m
" = 1.92 * 1.33 mg
" = 2.55 mgd

Mixing Zone Predictions for Hall Creek WWTP

Effluent Flow = 0.95 MGD
Stream 7Q10 = 1.28 MGD
Stream 30Q10 = 1.39 MGD
Stream 1Q10 = 1.09 MGD
Stream slope = 0.02 ft/ft
Stream width = 10 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .368 ft
Length = 209.51 ft
Velocity = .9382 ft/sec
Residence Time = .0026 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .379 ft
Length = 204.11 ft
Velocity = .9556 ft/sec
Residence Time = .0025 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .3483 ft
Length = 219.89 ft
Velocity = .9067 ft/sec
Residence Time = .0674 hours

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 1Q10 may be used.

Calculation of Total Ammonia Nitrogen Limits

Facility Name: Hall Creek WWTP
VPDES Permit No: VA0097378
Stream Name: Hall Creek
Stream Tier Designation: Tier I

NH_3-N limits are derived from the ammonia tables or formulas in the Water Quality Standards. Human Health standards are not applicable for ammonia.

The following stream parameter values are being used for the calculations. The dry season is June - December and the wet season is January - May. pH & Temp. based on Storet data & BPJ

Dry Season pH = 8.2
Wet Season pH = 8.2
Dry Season Temperature (deg.C) = 18
Wet Season Temperature (deg.C) = 14

The ammonia nitrogen water quality standards (WQS) are:

Acute: AC_{dry} = 5.72 AC_{wet} = 5.72

Chronic: CC_{dry} = 1.43 CC_{wet} = 1.79

The following flows apply:

Q_e = Design Flow of STP(MGD) = 0.95
Q_{s-1} = 1Q10 Flow (MGD) = 1.28
Q_{s-1w} = 1Q10 High Flow (MGD) = 1.92
Q_{s-30} = 30Q10 Flow (MGD) = 1.39
Q_{s-30w} = 30Q10 High Flow (MGD) = 2.55

The water quality wasteload allocations (WLAs) are calculated as follows:

f = fraction of stream flow to use from MIX Program

Acute:

Dry WLA_a = $[AC_{dry}((f)Q_{s-1} + Q_e) - (f)(Q_{s-1})(NH_3\text{-N background})] / (Q_e)$ mg/l
Dry WLA_a = $[5.72((1)1.28 + 0.95) - ()()()] / (0.95)$ mg/l
Dry WLA_a = 13.4 mg/l

Wet WLA_a = $[AC_{wet}((f)Q_{s-1w} + Q_e) - (f)(Q_{s-1w})(NH_3\text{-N background})] / (Q_e)$ mg/l
Wet WLA_a = $[5.72((1)1.92 + 0.95) - ()()()] / (0.95)$ mg/l
Wet WLA_a = 17.3 mg/l

Chronic:

Dry WLA_c = $[CC_{dry}((f)Q_{s-30} + Q_e) - (f)(Q_{s-30})(NH_3\text{-N background})] / (Q_e)$
Dry WLA_c = $[1.43((1)1.39 + 0.95) - ()()()] / (0.95)$ mg/l
Dry WLA_c = 3.5 mg/l

Wet WLA_c = $[CC_{wet}((f)Q_{s-30w} + Q_e) - (f)(Q_{s-30w})(NH_3\text{-N background})] / (Q_e)$
Wet WLA_c = $[1.79((1)2.55 + 0.95) - ()()()] / (0.95)$ mg/l
Wet WLA_c = 6.6 mg/l

12/7/2011 9:52:24 AM

Facility = Hall Creek WWTP - Dry
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 13.4
WLAc = 3.5
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 7.06184532695709
Average Weekly limit = 5.16534227422404 ≈ 5.2 mg/l
Average Monthly LImit = 3.8475048601624 ≈ 3.8 mg/l

The data are:

15

12/7/2011 9:53:19 AM

Facility = Hall Creek WWTP - Wet
Chemical = Ammonia Nitrogen
Chronic averaging period = 30
WLAa = 17.3
WLAc = 6.6
Q.L. = 0.2
# samples/mo. = 12
# samples/wk. = 3

Summary of Statistics:

observations = 1
Expected Value = 15
Variance = 81
C.V. = 0.6
97th percentile daily values = 36.5012
97th percentile 4 day average = 24.9568
97th percentile 30 day average= 18.0907
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 13.3166226165476
Average Weekly limit = 9.74035971710819 ≈ 9.7 mg/l
Average Monthly LImit = 7.25529487916339 ≈ 7.2 mg/l

The data are:

15

6CBYS000.23	Temp Celcius	Field Ph
20-Oct-11	10.2	8.2
17-Aug-11	17.5	8.3
1-Jun-11	17.5	8.2
11-Apr-11	13.8	8.2
15-Feb-11	7.7	8.4
5-Nov-08	13.6	8.2
17-Sep-08	18.8	8.1
2-Jul-08	18.6	8.4
6-May-08	14.1	8.1
13-Mar-08	8.1	8.1
31-Jan-08	4.7	8.2
13-Nov-07	11.0	7.5
13-Sep-07	18.1	7.8
31-Jul-07	18.4	7.9
22-May-07	17.2	
7-Mar-07	9.6	8.0
9-Jan-07	7.1	7.6
28-Nov-06	10.0	8.2
14-Sep-06	16.2	7.8
26-Jul-06	17.9	8.1
25-May-06	13.4	8.1
23-Mar-06	8.6	8.1
9-Jan-06	7.6	8.2

Calculation of Total Residual Chlorine

Facility Name: Hall Creek WWTP

Assumimg a background value of 0:

ACUTE

$$WQ\text{-}WLA = \frac{AO_d\ (Qs\text{-}1_{dry} + Qe)}{Qe}$$

$$WQ\text{-}WLA_{ad} = (0.019)(1.09 + 0.63)/0.63 = \mathbf{0.052\ mg/l}$$

CHRONIC

$$AWLA_{cd} = \frac{Co_d(Qs\text{-}7_{dry} + Qe)]}{Qe}$$

$$AWLA_{cd} = (0.011)(1.28 + 0.63)/0.63 = \mathbf{0.033\ mg/l}$$

The effluent limitations were calculated using the WLA322 Program. See attached computer printout on the next page.

Facility = Hall Creek WWTP
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.052
WLAc = 0.033
Q.L. = 0.1
# samples/mo. = 30
# samples/wk. = 7

Summary of Statistics:

observations = 1
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 4.82649678737566E-02
Average Weekly limit = 2.94757637141583E-02 ≈ 0.029 mg/l
Average Monthly LImit = 2.39211395516274E-02 ≈ 0.024 mg/l

The data are:

1

12/12/2011 10:58:43 AM

Facility = Hall Creek WWTP
Chemical = Total Residual Chlorine
Chronic averaging period = 4
WLAa = 0.042
WLAc = 0.026
Q.L. = 0.2
# samples/mo. = 90
# samples/wk. = 23

Summary of Statistics:

observations = 1
Expected Value = 1
Variance = .36
C.V. = 0.6
97th percentile daily values = 2.43341
97th percentile 4 day average = 1.66379
97th percentile 30 day average= 1.20605
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 0.038026944385384
Average Weekly limit = 1.96023426378312E-02 ≈ 0.02 mg/l
Average Monthly LImit = 1.74860314878864E-02 ≈ 0.017 mg/l

The data are:

1

UA00873
Original Calculations

Mass Balance Calculations for Total Ammonia

Facility Name: Proposed Emory - Meadowview WWTP - Hall Creek, 0.63 MGD

Based on the Ammonia Criteria Section of the proposed amended Water Quality Standards, Table 2B summer and winter ammonia requirements were calculated. These requirements were based on a 90th. percentile summer temperature of 23 °C and a winter tier temperature of 15 °C, and a pH of 8.

The total ammonia requirements were calculated as follows:

Standard (summer) = 1.28 x .822 mg/l = 1.05 mg/l
Standard (winter) = 1.57 x .822 mg/l = 1.29 mg/l

A = required ammonia effluent concentration, mg/l

Required instream total ammonia concentration (from Water Quality Standards) = C = 1.05 mg/l summer, 1.29 mg/l winter

$$C = \frac{\left(\begin{matrix}Q7\text{-}10\ of\\ Stream,\ MGD\end{matrix}\right) \times \left(\begin{matrix}Background\ Total\\ Ammonia\ concen.\\ mg/l\end{matrix}\right) + \left(\begin{matrix}STP\ Flow,\\ MGD\end{matrix}\right) \times (A)}{(Q7\text{-}10\ Flow\ of\ Stream,\ MGD) + (STP\ Flow,\ MGD)}$$

Solving for A, assuming a background total ammonia concentration of 0 mg/l:

$$A = C\left(Q7\text{-}10\ Flow\ of\ Stream, MGD + STP\ Flow, MGD\right) \Big/ \left(\begin{matrix}STP\ Flow\\ MGD\end{matrix}\right)$$

$A_{summer\ limit} = 1.05(1.52 + 0.63)/(.63) = 3.58\ mg/l$

$\simeq \boxed{3.6\ mg/l}$

$A_{winter\ limit} = 1.29(1.52 + 0.63)/(0.63) = \boxed{4.4\ mg/l}$

****

REGIONAL MODELING SYSTEM VERSION 3.2

****

MODEL SIMULATION FOR THE Emory - Meadowview WWTP DISCHARGE

TO Hall Creek

THE SIMULATION STARTS AT THE Emory - Meadowview WWTP DISCHARGE

********** PROPOSED PERMIT LIMITS **********

FLOW = .63 MGD cBOD5 = 25 Mg/L TKN = 7 Mg/L D.O. = 6.5 Mg/L

**** THE MAXIMUM CHLORINE ALLOWABLE IN THE DISCHARGE IS 0.038 Mg/L ****

NH_3-N = 3.6 mg/l (summer) NH_3-N = 4.4 mg/L (winter)

THE SECTION BEING MODELED IS 1 SEGMENT LONG
RESULTS WILL BE GIVEN AT 0.1 MILE INTERVALS

********** BACKGROUND CONDITIONS **********

THE 7Q10 STREAM FLOW AT THE DISCHARGE IS 1.52409 MGD
THE DISSOLVED OXYGEN OF THE STREAM IS 7.235 Mg/L
THE BACKGROUND cBODu OF THE STREAM IS 5 Mg/L
THE BACKGROUND nBOD OF THE STREAM IS 0 Mg/L

********** MODEL PARAMETERS **********

SEG.	LEN. Mi	VEL. F/S	K2 1/D	K1 1/D	KN 1/D	BENTHIC Mg/L	ELEV. Ft	TEMP. °C	DO-SAT Mg/L
1	1.25	0.762	20.000	1.200	0.400	0.000	1922.00	23.00	8.039

(The K Rates shown are at 20°C ... the model corrects them for temperature.)

********** RESPONSE FOR SEGMENT 1 **********

TOTAL STREAMFLOW = 2.1541 MGD
(Including Discharge)

DISTANCE FROM HEAD OF SEGMENT (MI.)	TOTAL DISTANCE FROM MODEL BEGINNING (MI.)	DISSOLVED OXYGEN (Mg/L)	cBODu (Mg/L)	nBODu (Mg/L)
0.000	0.000	7.020	21.817	5.065
0.100	0.100	6.942	21.577	5.045
0.200	0.200	6.879	21.340	5.025
0.300	0.300	6.829	21.105	5.004
0.400	0.400	6.789	20.874	4.984
0.500	0.500	6.758	20.644	4.964
0.600	0.600	6.734	20.417	4.944
0.700	0.700	6.716	20.193	4.924
0.800	0.800	6.703	19.971	4.904
0.900	0.900	6.695	19.751	4.885
1.000	1.000	6.690	19.534	4.865
1.100	1.100	6.689	19.320	4.845
1.200	1.200	6.689	19.107	4.826
1.250	1.250	6.691	19.002	4.816

ANTIDEGRADATION IS VIOLATED IN THIS SEGMENT

****

REGIONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
03-02-1992 10:43:50

DATA FILE = EMORYMED.MOD

****

REGIONAL MODELING SYSTEM VERSION 3.2

DATA FILE SUMMARY

****

NAME OF THE DATA FILE IS: EMORYMED.MOD

STREAM NAME IS: Hall Creek
RIVER BASIN IS: Tennessee-Big Sandy River
SECTION NUMBER IS: 5
CLASSIFICATION IS: IV

NDARDS VIOLATED (Y/N) = N
NDARDS APPROPRIATE (Y/N) = Y

CHARGE WITHIN 3 MILES (Y/N) = N

DISCHARGE BEING MODELED IS: Emory - Meadowview WWTP

OSED LIMITS ARE:
FLOW = .63 MGD
BOD5 = 25 MG/L
TKN = 7 MG/L
D.O. = 6.5 MG/L

NUMBER OF SEGMENTS TO BE MODELED = 1

WILL BE CALCULATED BY: DRAINAGE AREA COMPARISON
THE GAUGE NAME IS: Middle Fork Holston River near Meadowview
GAUGE DRAINAGE AREA = 211 SQ.MI.
GAUGE 7Q10 = 32.32 MGD
DRAINAGE AREA AT DISCHARGE = 9.95 SQ.MI.

AM A DRY DITCH AT DISCHARGE (Y/N) = N
DEGRADATION APPLIES (Y/N) = Y

CATION DESIGN TEMPERATURE = 23 °C

SEGMENT INFORMATION

SEGMENT # 1

ENT ENDS BECAUSE: THE MODEL ENDS

ENT LENGTH = 1.25 MI

ENT WIDTH = 10 FT
ENT DEPTH = .42 FT
ENT VELOCITY = .8 FT/SEC

NAGE AREA AT SEGMENT START = 9.95 SQ.MI.
NAGE AREA AT SEGMENT END = 14.75 SQ.MI.

ATION AT UPSTREAM END = 1964 FT
ATION AT DOWNSTREAM END = 1880 FT

CROSS SECTION IS: WIDE SHALLOW ARC
CHANNEL IS: MODERATELY MEANDERING

S AND RIFFLES (Y/N) = Y
THE SEGMENT LENGTH IS 75 % POOLS
POOL DEPTH = .5 FT
THE SEGMENT LENGTH IS 25 % RIFFLES
RIFFLE DEPTH = .25 FT

BOTTOM TYPE = SMALL ROCK
SE DEPOSITS = NONE
TIC PLANTS = NONE
OBSERVED = COVERS ENTIRE BOTTOM
COLORED GREEN (Y/N) = N

****

ONAL MODELING SYSTEM Ver 3.2 (OWRM - 9/90)
-1992 10:07:15

Hall Creek WWTP

Metals Calculations for ~~Attachment~~ A

WLA = (chronic standard)(7Q10 + effluent flow) / effluent flow

Antimony : WLA = (4300)(1.28 + 0.95) / 0.95 ug/l = ~~10,098~~ 1000/300 ug/l

Arsenic : WLA = (150)(1.28 + 0.95) / 0.95 ug/l = ~~3,520~~ ug/l

Cadmium : WLA = (1.13)(1.28 + 0.95) / 0.95 ug/l = 2.6 ug/l

Chromium III : WLA = (74.11)(1.28 + 0.95) / 0.95 ug/l = 174 ug/l

Chromium VI : WLA = (11)(1.28 + 0.95) / 0.95 ug/l = 26 ug/l

Copper : WLA = (9.07)(1.28 + 0.95) / 0.95 ug/l = 21 ug/l

Lead : WLA = (13.5)(1.28 + 0.95) / 0.95 ug/l = 32 ug/l

Mercury : WLA = (0.77)(1.28 + 0.95) / 0.95 ug/l = 1.8 ug/l

Nickel : WLA = (20.27)(1.28 + 0.95) / 0.95 ug/l = 48 ug/l

Selenium : WLA = (5.01)(1.28 + 0.95) / 0.95 ug/l = 12 ug/l

Silver : WLA = (3.45)(1.59 ← 1Q10 + 0.95) / 0.95 ug/l = 8 ug/l

Zinc : WLA = (120)(1.28 + 0.95) / 0.95 ug/l = 282 ug/l

Metals chronic criteria based on hardness value of 100 mg/l

ATTACHMENT 3

Threatened & Endangered Species Information

Wyatt, Frederick (DEQ)

From: Wyatt, Frederick (DEQ)
Sent: Thursday, January 26, 2012 9:22 AM
To: Cason, Gladys (DGIF); 'Cindy_Kane@fws.gov'
Subject: T&E Coordination for Hall Creek WWTP, VPDES Permit # VA0087378
Attachments: doc00746720120126091427.pdf

Fred M. Wyatt
Environmental Engineer Senior
(276) 676-4810
email: Frederick.Wyatt@deq.virginia.gov

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY	**VPDES PERMITS** **Threatened and Endangered Species Coordination**
To: (X) DGIF, Environmental Review Coordinator ( ) DCR (X) USFWS, T/E Review Coordinator **From: Fred M. Wyatt** **DEQ, Southwest Regional Office** **P.O. Box 1688** **Abingdon, VA 24212-1688** **frederick.wyatt@deq.virginia.gov**	**Date Sent: 01/25/2012** **Permit Number: VA0087378**
Facility Name: Hall Creek Wastewater Treatment Plant **Contact: Robert C.H. Cornett** **Phone: (276) 628-7151** **Address: Washington County Service Authority** **25122 Regal Drive** **P.O. Box 1447** **Abingdon, VA 24212-1447**	**Location: 32430 Lee Highway, Glade Spring, VA 24340** **USGS Quadrangle: Glade Spring, VA** **Latitude/Longitude: $36^0$45'02''/$81^0$47'54''** **Receiving Stream: Hall Creek** **Receiving Stream Flow Statistics used for Permit: 1Q10 Flow = 1.09 MGD** **7Q10 Flow = 1.28 MGD** **30Q 10 Flow = 1.39 MGD** **Topo Map Attached**
Effluent Characteristics and Max Daily Flow: See attached draft permit pages	**Species Search Results (or attach database report and map):** **None confirmed in Hall Creek**

Attach draft permit effluent limits page if available or attach existing effluent limits page (make sure it is clear in your email which one it is – draft current or existing).

DGIF email: Gladys.Cason@dgif.virginia.gov USFWS email: cindy_kane@fws.gov
DCR: If Natural Heritage Data Explorer (NHDE) has the needed information DCR does not need this form. If you have additional information you wish to add, you may do so in the comments field on the NHDE form. DCR will contact you directly if they need more information.

TE Waters Middle Fork Holston River

36,44,31.2 -81,46,46.1
is **Item Location**

Point of Interest
Change to "clicked" map point
Fixed at 36,44,31.2 -81,46,46.1
Item Location is at map center

Show Position Rings
Yes No
1 mile and 1/4 mile at the **Item Location**

Base Map Choices
Topography

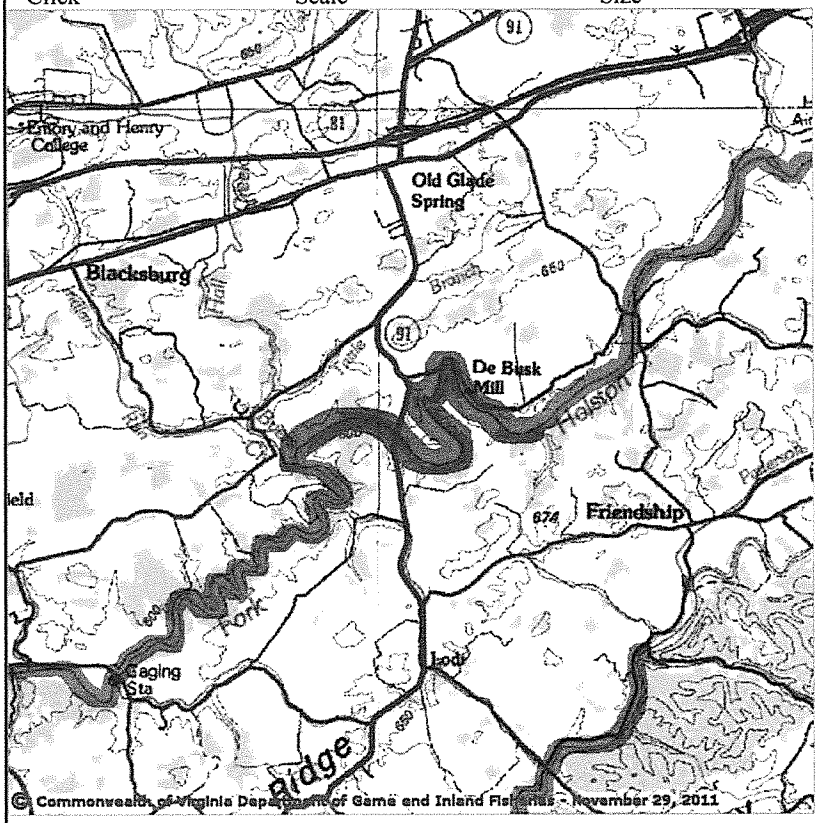
Map Overlay Choices
Current List: Observation

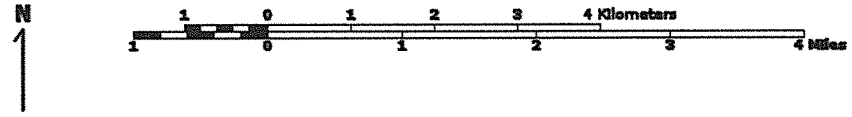
Map Overlay Legend

T & E Waters
Federal
Selected Federal
State
Selected State
Data
Observation Site

back | Refresh Browser Page

Map Click: Pan | Map Scale: In Zoom Out | Screen Size: Small Size Big | Help





Point of Interest 36,44,31.2 -81,46,46.1
Map Location 36,44,31.2 -81,46,46.1

Select **Coordinate System:**
Degrees,Minutes,Seconds Latitude - Longitude
Decimal Degrees Latitude - Longitude
Meters UTM NAD83 East North Zone
Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft terraserver-usa.com for details)

Map projection is UTM Zone 17 NAD 1983 with left 425626 and top 4071352. Pixel size is 16 meters . Coordinates displayed are Degrees, Minutes, Seconds North and West.Map is currently displayed as 600 columns by 600 rows for a total of 360000 pixles. The map display represents 9600 meters east to west by 9600 meters north to south for a total of 92.1 square kilometers. The map display represents 31501 feet east to west by 31501 feet north to south for a total of 35.5 square miles.

Topographic maps and Black and white aerial photography for year 1990+- are from the United States Department of the Interior, United States Geological Survey.
Color aerial photography aquired 2002 is from Virginia Base Mapping

	Program, Virginia Geographic Information Network. Shaded topographic maps are from TOPO! ©2006 National Geographic http://www.national.geographic.com/topo All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheries. map assembled 2011-11-29 14:59:03 (qa/qc October 21, 2011 15:16 - tn=0 dist=0 V)

| DGIF | Credits | Disclaimer | Contact shirl.dressler@dgif.virginia.gov |Please view our privacy policy |
© Copyright: 1998-2011 Commonwealth of Virginia Department of Game and Inland Fisheries

VaFWIS Initial Project Assessment Report

Help

Compiled on 1/18/2012, 2:27:27 PM

Known or likely to occur within a **2 mile radius around point 36,46,09.3 - 81,48,14.1** (excluding Middle Fork Holston River) in **191 Washington County, VA**

View Map of Site Location

479 Known or Likely Species ordered by Status Concern for Conservation (displaying first 47) (47 species with Status* or Tier I** or Tier II**)

BOVA Code	Status*	Tier**	Common Name	Scientific Name	Confirmed	Database(s)
060094	FESE	I	Pearlymussel, littlewing	Pegias fabula		HU6
060052	FESE	I	Pigtoe, shiny	Fusconaia cor		BOVA
060122	FESE	I	Rabbitsfoot, rough	Quadrula cylindrica strigillata		BOVA
060036	FESE	I	Riffleshell, tan	Epioblasma florentina walkeri		BOVA,HU6
050021	FESE	II	Bat, gray	Myotis grisescens		BOVA,HU6
050035	FESE	II	Bat, Virginia big-eared	Corynorhinus townsendii virginianus		HU6
010330	FTST	I	Chub, spotfin	Erimonax monachus		BOVA,HU6
010430	SE	I	Dace, Tennessee	Chrosomus tennesseensis		BOVA,HU6,Habitat
010344	SE	I	Darter, sharphead	Etheostoma acuticeps		BOVA,HU6
040267	SE	I	Wren, Bewick's	Thryomanes bewickii		BOVA
060080	SE	II	Heelsplitter, Tennessee	Lasmigona holstonia		HU6,Habitat
060139	FSSE	II	Lilliput, purple	Toxolasma lividus		HU6

060007	SE	II	Mussel, slippershell	Alasmidonta viridis		BOVA,HU6
040096	ST	I	Falcon, peregrine	Falco peregrinus		BOVA
040293	ST	I	Shrike, loggerhead	Lanius ludovicianus	Yes	BOVA,SppObs,HU6
010352	ST	II	Darter, greenfin	Etheostoma chlorobranchium		BOVA
010342	ST	II	Darter, longhead	Percina macrocephala		BOVA,HU6
040093	FSST	II	Eagle, bald	Haliaeetus leucocephalus		BOVA,HU6
060083	FCST	II	Pearlymussel, slabside	Lexingtonia dolabelloides		HU6,Habitat
060069	FSST	III	Riversnail, spiny	Io fluvialis		BOVA,HU6
060086	ST	III	Sandshell, black	Ligumia recta		BOVA,HU6
040292	ST		Shrike, migrant loggerhead	Lanius ludovicianus migrans		BOVA
060146	FP	II	Bean, rayed	Villosa fabalis		BOVA
060121	FC	II	Kidneyshell, fluted	Ptychobranchus subtentum		BOVA,HU6,Habitat
100248	FS	I	Fritillary, regal	Speyeria idalia idalia		BOVA,HU6
010341	FS	II	Logperch, blotchside	Percina burtoni		BOVA,HU6
060050	FS	II	Pigtoe, Tennessee	Fusconaia barnesiana		BOVA,HU6,Habitat
110398	FS	II	Millipede, Turner's	Brachoria turneri		HU6
070010	FS	III	Amphipod, James Cave	Stygobromus abditus		BOVA
100001	FS	IV	fritillary, Diana	Speyeria diana		BOVA
020020	CC	II	Hellbender, eastern	Cryptobranchus alleganiensis alleganiensis		BOVA,HU6

030012	CC	IV	Rattlesnake, timber	Crotalus horridus		BOVA,HU6
040372		I	Crossbill, red	Loxia curvirostra		BOVA
040225		I	Sapsucker, yellow-bellied	Sphyrapicus varius		BOVA
040319		I	Warbler, black-throated green	Dendroica virens		BOVA
040306		I	Warbler, golden-winged	Vermivora chrysoptera	Yes	BOVA,SppObs,HU6
060209		I	Hornsnail, bottle	Pleurocera gradata		BOVA
010075		II	Shiner, popeye	Notropis ariommus		BOVA,HU6
020011		II	Frog, mountain chorus	Pseudacris brachyphona		BOVA,HU6,Habitat
020030		II	Salamander, green	Aneides aeneus		BOVA,HU6
020081		II	Salamander, southern zigzag	Plethodon ventralis		BOVA,HU6,Habitat
020078		II	Salamander, Weller's	Plethodon welleri		BOVA
040052		II	Duck, American black	Anas rubripes		BOVA,HU6
040213		II	Owl, northern saw-whet	Aegolius acadicus		BOVA,HU6
040320		II	Warbler, cerulean	Dendroica cerulea		BOVA,HU6
040304		II	Warbler, Swainson's	Limnothlypis swainsonii		BOVA,HU6
040266		II	Wren, winter	Troglodytes troglodytes		BOVA

To view **All 479 species** View 479

* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; FS=Federal Species of Concern; CC=Collection Concern

** I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Anadromous Fish Use Streams

N/A

Colonial Water Bird Survey

N/A

Threatened and Endangered Waters

N/A

Managed Trout Streams

(2 records) (Click on Stream Name to view complete reach history)

View Map of All Trout Stream Surveys

Reach ID	Stream Name	Class	Brook Trout	Brown Trout	Rainbow Trout	View Map
03HAL-01	Hall Creek	Stockable				Yes
03HAL-01T	Hall Creek	Stockable				Yes

Bald Eagle Concentration Areas and Roosts

N/A

Bald Eagle Nests

N/A

Stream Name	Tier Species	

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

December 21, 2011

Fred Wyatt
DEQ-SRO
P.O. Box 1688
Abingdon, VA 24212

Re: VA0087378, Hall Creek Wastewater Treatment Plant

Dear Mr. Wyatt:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Middle Fork Holston River – Craig Bridge Stream Conservation Unit is located downstream from the project site. Stream Conservation Units (SCUs) identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are also given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The Middle Fork Holston River – Craig Bridge SCU has been given a biodiversity ranking of B2, which represents a site of very high significance. The natural heritage resources associated with this site are:

Epioblasma florentina walkeri	Tan riffleshell	G1T1/S1/LE/LE
Fusconaia barnesiana	Tennessee pigtoe	G2G3/S2/NL/NL
Fusconaia cor	Shiny pigtoe	G1/S1/LE/LE
Lexingtonia dolabelloides	Slabside pearlymussel	G2/S2/SOC/LT
Pleurobema oviforme	Tennessee clubshell	G2G3/S2S3/SOC/NL
Ptychobranchus subtentum	Fluted kidneyshell	G2/S2/SOC/NL

In addition, Middle Fork 1 Holston River has been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as a "Threatened and Endangered Species Water". The species associated with this T & E Water is the Tan riffleshell, Rough rabbits foot *(Quadrula cylindrica strigillata,* G3G4T2/S2/LE/LE), and Purple bean (*Villosa perpurpurea*, G1/S1/LE/LE).

Due to the legal status of several of the natural heritage resources associated with this site, DCR recommends coordination with the U.S. Fish and Wildlife Service (USFWS) and the VDGIF to ensure

compliance with protected species legislation. To minimize impacts to aquatic resources, DCR also recommends the use of uv/ozone to replace chlorination disinfection and utilization of new technologies as they become available to improve water quality.

This project is situated on karst-forming carbonate rock and can be characterized by sinkholes, caves, disappearing streams, and large springs. If such features are encountered during the project, please coordinate with Wil Orndorff (540-553-1235, Wil.Orndorff@dcr.virginia.gov) to document and minimize adverse impacts. Discharge of runoff to sinkholes or sinking streams, filling of sinkholes, and alteration of cave entrances can lead to surface collapse, flooding, erosion and sedimentation, groundwater contamination, and degradation of subterranean habitat for natural heritage resources. If the project involves filling or "improvement" of sinkholes or cave openings, DCR would like detailed location information and copies of the design specifications. In cases where sinkhole improvement is for stormwater discharge, copies of VDOT Form EQ-120 will suffice.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Shirl Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,

S. Rene' Hypes
Project Review Coordinator

CC: Tylan Dean, USFWS
Ernie Aschenbach, VDGIF
Wil Orndorff, DCR-Karst

Habitat Predicted for Aquatic WAP Tier I & II Species

(6 Reaches)

View Map Combined Reaches from Below of Habitat Predicted for WAP Tier I & II Aquatic Species

	Highest TE*	BOVA Code, Status*, Tier**, Common & Scientific Name					View Map
(06010102)	FCSE	010430	SE	I	Dace, Tennessee	Chrosomus tennesseensis	Yes
		060050	FS	II	Pigtoe, Tennessee	Fusconaia barnesiana	
		060080	SE	II	Heelsplitter, Tennessee	Lasmigona holstonia	
		060083	FCST	II	Pearlymussel, slabside	Lexingtonia dolabelloides	
		060121	FC	II	Kidneyshell, fluted	Ptychobranchus subtentum	
Hall Creek (06010102)	FCSE	010430	SE	I	Dace, Tennessee	Chrosomus tennesseensis	Yes
		060050	FS	II	Pigtoe, Tennessee	Fusconaia barnesiana	
		060080	SE	II	Heelsplitter, Tennessee	Lasmigona holstonia	
		060083	FCST	II	Pearlymussel, slabside	Lexingtonia dolabelloides	
		060121	FC	II	Kidneyshell, fluted	Ptychobranchus subtentum	
(06010102)	SE	010430	SE	I	Dace, Tennessee	Chrosomus tennesseensis	Yes
East Fork Hall Creek (06010102)	SE	010430	SE	I	Dace, Tennessee	Chrosomus tennesseensis	Yes
Hall Creek (06010102)	SE	010430	SE	I	Dace, Tennessee	Chrosomus tennesseensis	Yes

Richardson Branch (06010102)	SE	010430	SE	I	Dace, Tennessee	Chrosomus tennesseensis	Yes

Habitat Predicted for Terrestrial WAP Tier I & II Species

(2 Species)

View Map of Combined Terrestrial Habitat Predicted for 2 WAP Tier I & II Species Listed Below ordered by Status Concern for Conservation

BOVA Code	Status*	Tier**	Common Name	Scientific Name	View Map
020011		II	Frog, mountain chorus	Pseudacris brachyphona	Yes
020081		II	Salamander, southern zigzag	Plethodon ventralis	Yes

Public Holdings:

N/A

Compiled on 1/18/2012, 2:27:27 PM I370970.0 report= IPA searchType= R dist= 3218 poi= 36,46,09.3 -81,48,14.1

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Managed Trout Stream
Hall Creek

36,44,31.2 -81,46,45.9
is **the Search Point**

Display in center **Item Location** is not at map center

Show Position Rings
Yes No
1 mile and 1/4 mile at the **Search Point**

Show Search Area
Yes No
3 Search distance miles radius

Search Point is at map center

Base Map Choices
Topography

Map Overlay Choices
Current List: Position, Search, Observation

Map Overlay Legend

Trout Waters
Class I - IV
Selected Class I - IV
Class V - VI
Selected Class V - VI

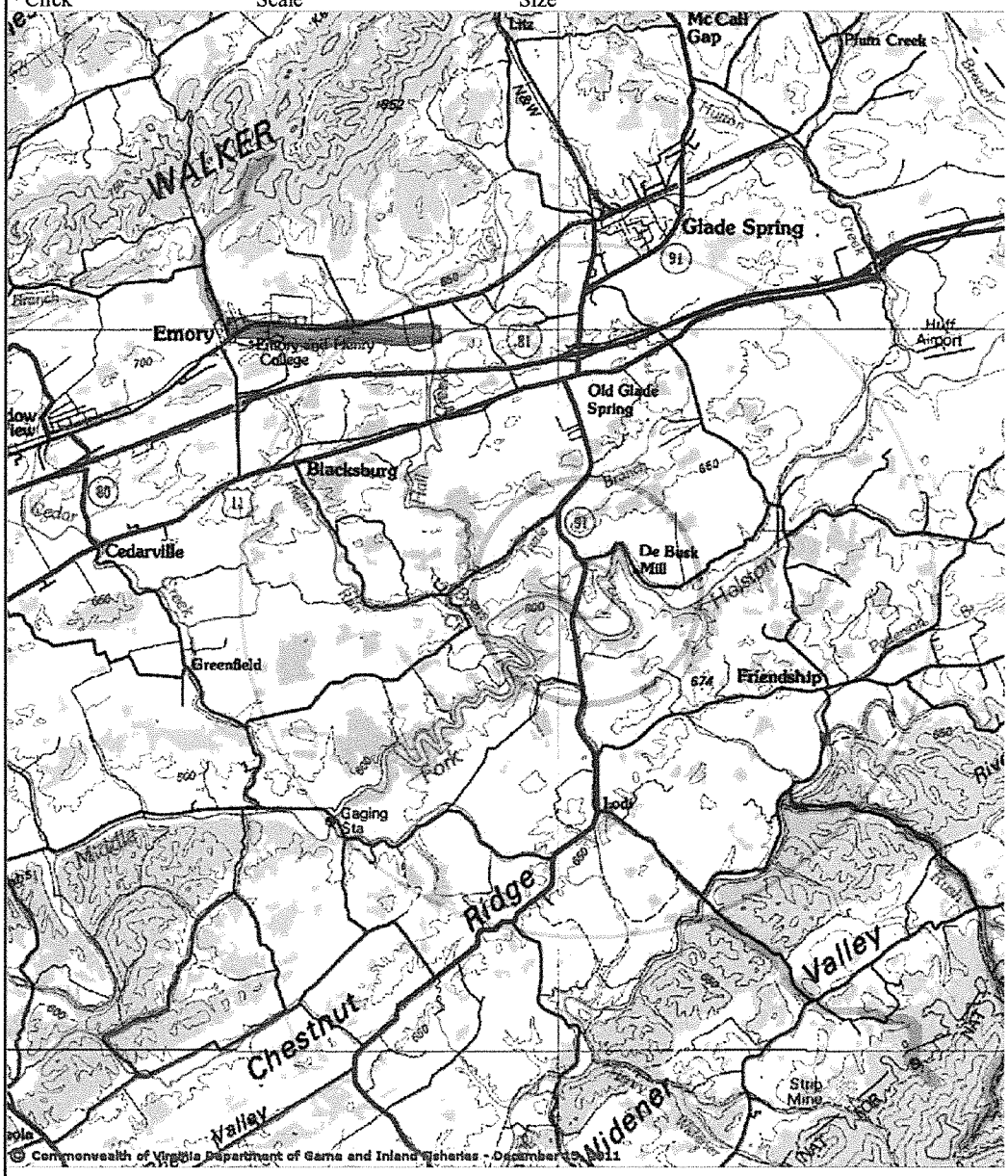
Position Rings 1 mile and 1/4 mile at the Search Point

3 mile radius Search Area

Data Observation Site

back | Refresh Browser Page | Help

Map Click Pan | Map Scale In Zoom Out | Screen Size Small Size Big



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1 0 1 2 3 4 Kilometers
1 0 1 2 3 4 Miles

Point of Search 36,44,31.2 -81,46,45.9
Map Location 36,44,31.2 -81,46,45.9

Select **Coordinate System:**
Degrees,Minutes,Seconds Latitude - Longitude
Decimal Degrees Latitude - Longitude
Meters UTM NAD83 East North Zone
Meters UTM NAD27 East North Zone

Base Map source: USGS 1:100,000 topographic maps (see Microsoft terraserver-usa.com for details)

Map projection is UTM Zone 17 NAD 1983 with left 422431 and top

4074552. Pixel size is 16 meters . Coordinates displayed are Degrees, Minutes, Seconds North and West.Map is currently displayed as 1000 columns by 1000 rows for a total of 1000000 pixles. The map display represents 16000 meters east to west by 16000 meters north to south for a total of 256.0 square kilometers. The map display represents 52502 feet east to west by 52502 feet north to south for a total of 98.8 square miles.

Topographic maps and Black and white aerial photography for year 1990+- are from the United States Department of the Interior, United States Geological Survey.
Color aerial photography aquired 2002 is from Virginia Base Mapping Program, Virginia Geographic Information Network.
Shaded topographic maps are from TOPO! ©2006 National Geographic http://www.national.geographic.com/topo
All other map products are from the Commonwealth of Virginia Department of Game and Inland Fisheries.

map assembled 2011-12-15 14:18:26 (qa/qc December 1, 2011 15:16 - tn=367674.0 dist=4827 Visitor)

| DGIF | Credits | Disclaimer | Contact shirl.dressler@dgif.virginia.gov |Please view our privacy policy |
© Copyright 1998-2011 Commonwealth of Virginia Department of Game and Inland Fisheries

Wyatt, Frederick (DEQ)

From: nhreview (DCR)
Sent: Wednesday, December 21, 2011 4:45 PM
To: Wyatt, Frederick (DEQ)
Cc: ProjectReview (DGIF); 'Tylan_Dean@fws.gov'; Orndorff, Wil (DCR)
Subject: VA0087378, Hall Creek Wastewater Treatment Plant
Attachments: 61541, DEQ VA0087378, Hall Creek Wastewater Treatment Plant.pdf

Mr. Wyatt,

Please find attached the Department of Conservation and Recreation, Division of Natural Heritage (DCR-DNH) comments for the above referenced project. The comments are in pdf format and can be printed for your records. Also species rank information is available at http://www.dcr.virginia.gov/natural_heritage/help.shtml for your reference.

Please send a confirmation e-mail upon receipt of our comments. Let us know if you have any questions.

Thank you for the opportunity to comment on this project.

René

S. Rene' Hypes
Project Review Coordinator
DCR-DNH
217 Governor Street
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcr.virginia.gov

25th ANNIVERSARY 1986-2011
VIRGINIA NATURAL HERITAGE PROGRAM

Conserving VA's Biodiversity through Inventory, Protection and Stewardship
www.dcr.virginia.gov/natural_heritage
Virginia Natural Heritage Program on Facebook

Wyatt, Frederick (DEQ)

From: gis@timmons.com
Sent: Thursday, December 01, 2011 2:43 PM
To: nhwebreview (DCR); Wyatt, Frederick (DEQ)
Subject: Hall Creek Wastewater Treatment Plant - frederick.wyatt@deq.virginia.gov
Attachments: DCR_NH_REPORT.pdf

Thank you for submitting your project to DCR Natural Heritage. Attached is an overview of the results and potential conflicts.

DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

WebID: W634583473611562500

Client Project Number: VA0087378

PROJECT INFORMATION

TITLE: Hall Creek Wastewater Treatment Plant

DESCRIPTION: Reissuance of existing VPDES permit for 0.63 MGD WWTP

EXISTING SITE CONDITIONS: Existing discharge into Hall Creek with calculated mixing zone of 150 ft.

QUADRANGLES: GLADE SPRING

COUNTIES: Washington

Latitude/Longitude (DMS): 364502/814753

Acreage:

Comments: Existing .63 MGD discharge into Hall Creek with 7Q10 of 1.28 MGD and 1Q10 of 1.09 MGD. No proposed upgrade or expansion is planned at this time.

REQUESTOR INFORMATION

Priority: No **Tier Level:** 2 **Tax ID:**

Contact Name: Fred Wyatt

Company Name: DEQ-Southwest Regional Office

Address: PO Box 1688

City: Abingdon **State:** VA **Zip:** 24212

Phone: 276-676-4810 **Fax:** 276-676-4899 **Email:** frederick.wyatt@deq.virginia.gov

Conservation Site Name	Site Type	Brank	Acreage	Listed Species Presence
	GLNHR			SL
	GLNHR			SL
	GLNHR			SL
	GLNHR			NL
	GLNHR			NL
	GLNHR			NL
MIDDLE FORK HOLSTON RIVER - CRAIG BRIDGE SCU	SCU	B2	39	FL
SOUTH FORK - MIDDLE FORK HOLSTON RIVER SCU	SCU	B2	220	FL
Natural Heritage Conservation Sites within Search Radius				

Site-Name	Group-Name	common-name	scientific-name	GRANK	SRANK	Fed Status	st status	EO Rank	last obs date	precision
	Invertebrate Animal	Black Sandshell	Ligumia recta	G5	S2		LT	D	1996	S
	Invertebrate Animal	Elktoe	Alasmidonta marginata	G4	S1S2			X	ND	M
	Vertebrate Animal	Black Sculpin	Cottus baileyi	G4Q	S2			H	1888-08-08	G
	Vertebrate Animal	Emerald Shiner	Notropis atherinoides	G5	S1S2		LT	H	1888-08-08	M
	Vertebrate Animal	Mirror Shiner	Notropis spectrunculus	G4	S2			H	1888-08-08	
	Vertebrate Animal	Sickle darter	Percina williamsi	G2	S1S2	SOC	LT	H	1888-08-08	M
MIDDLE FORK HOLSTON RIVER - CRAIG BRIDGE SCU	Invertebrate Animal	Shiny Pigtoe	Fusconaia cor	G1	S1	LE	LE	D	1996	S
MIDDLE FORK HOLSTON RIVER - CRAIG BRIDGE SCU	Invertebrate Animal	Slabside Pearlymussel	Lexingtonia dolabelloides	G2	S2	C	LT	C	1998-09-16	S
MIDDLE FORK HOLSTON RIVER - CRAIG BRIDGE SCU	Invertebrate Animal	Tan Riffleshell	Epioblasma florentina walkeri	G1T1	S1	LE	LE	E	1998	S
MIDDLE FORK HOLSTON RIVER - CRAIG BRIDGE SCU	Invertebrate Animal	Tennessee Clubshell	Pleurobema oviforme	G2G3	S2S3	SOC		C	1998-09-16	S
MIDDLE FORK HOLSTON RIVER - CRAIG BRIDGE SCU	Invertebrate Animal	Tennessee Pigtoe	Fusconaia barnesiana	G2G3	S2	SOC		C	1998-09-16	S

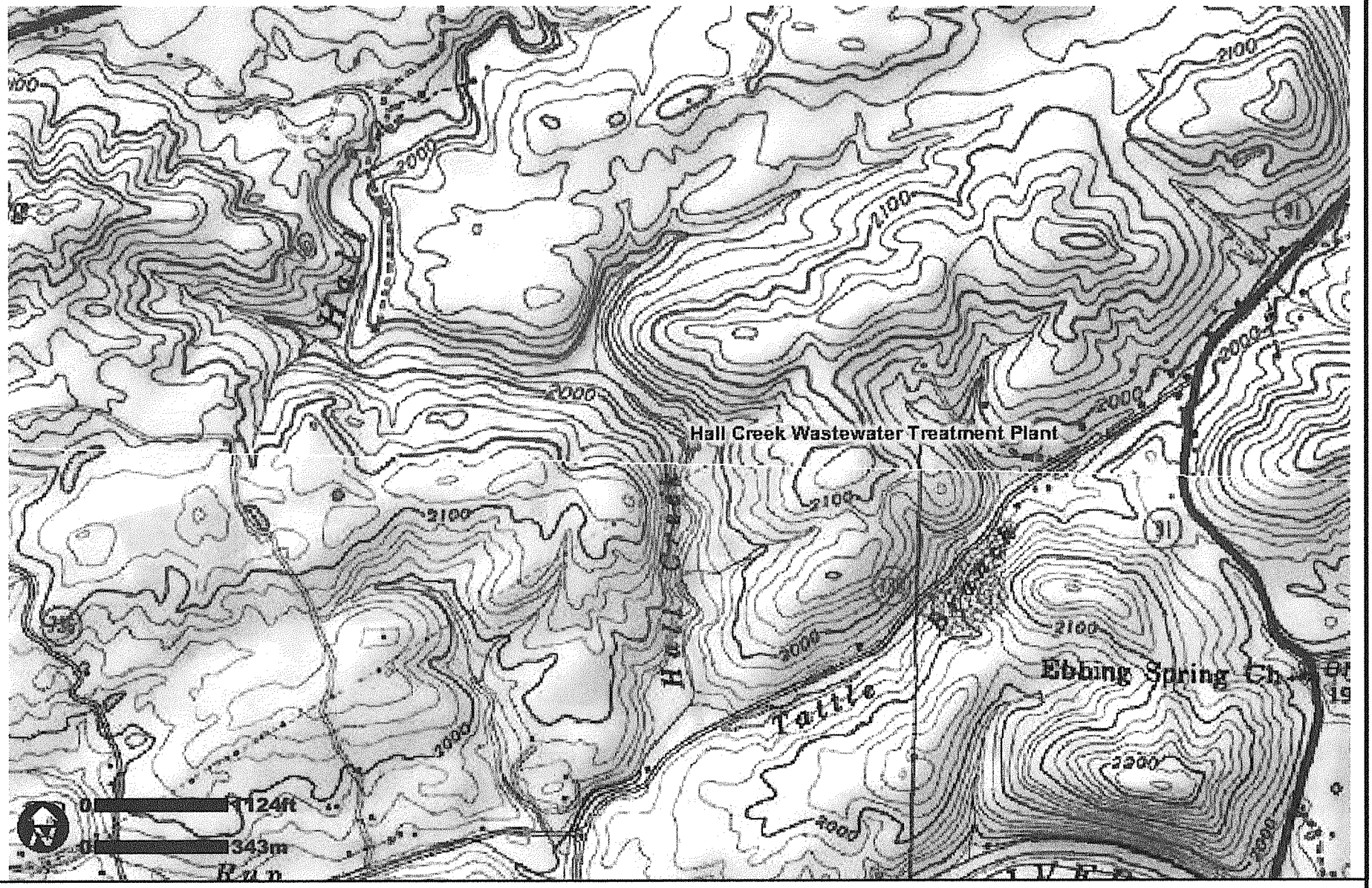
Natural Heritage Resources within Search Radius

Site-Name	Group-Name	common-name	scientific-name	GRANK	SRANK	Fed Status	st status	EO Rank	last obs date	precision
MIDDLE FORK HOLSTON RIVER - SULPHUR SPRING CREEK SCU	Invertebrate Animal	Fluted Kidneyshell	Ptychobranchus subtentum	G2	S2	C		C	1998-09-16	S

Natural Heritage Resources within Search Radius

DIABASE	INFO	SERIES	PRIORITY
NO	Conococheague Formation	Cambrian and Lower Ordovician Carbonates	

Affected Diabase Elements



Quads: GLADE SPRING

Counties: Washington

Hall Creek Wastewater Treatment Plant

Company: DEQ-Southwest Regional Office

Lat/Long: 364502/814753

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources from the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics files, NATURAL HERITAGE RESOURCES HAVE BEEN DOCUMENTED within two miles of the indicated project boundaries.

You have submitted this project to DCR for a more detailed review for potential impacts to natural heritage resources. DCR will review the submitted project to identify the specific natural heritage resources in the vicinity of the proposed project. Using the expertise of our biologists, DCR will evaluate whether your specific project is likely to impact these resources, and if so how. DCR's response will indicate whether any negative impacts are likely and, if so, make recommendations to avoid, minimize and/or mitigate these impacts. If the potential negative impacts are to species that are state- or federally-listed as threatened or endangered, DCR will also recommend coordination with the appropriate regulatory agencies: the Virginia Department of Game and Inland Fisheries for state-listed animals, the Virginia Department of Agriculture and Consumer Services for state-listed plants and insects, and the United States Fish and Wildlife Service for federally listed plants and animals. If your project is expected to have positive impacts we will report those to you with recommendations for enhancing these benefits.

Please allow up to 30 days for a response.

We will review the project based on the information you included in the Project Info submittal form, which is included in the report that follows. Often additional information can help us make a more accurate and detailed assessment of a project's potential impacts to natural heritage resources. If you have additional information that you believe will help us better assess your project's potential impacts, you may send that information to us. Please refer to the project Title (from the first page of this report) and include this pdf file with any additional information you send us.

Thank you for submitting your project for review to the Virginia Natural Heritage Program through the NH Data Explorer. Should you have any questions or concerns about DCR, the Data Explorer, or this report, please contact the Natural Heritage Project Review Unit at 804-371-2708.
its.

ATTACHMENT 4

TMDL Information

PUBLIC NOTICE – ENVIRONMENTAL PERMIT

PURPOSE OF NOTICE: To seek public comment on a draft permit and associated modification of a Total Maximum Daily Load (TMDL) from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Washington County, Virginia

PUBLIC COMMENT PERIOD: First public notice issue date **(to be entered by the newspaper)**. The comment period lasts for 30 days from this date.

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater, issued by DEQ under the authority of the State Water Control Board.

APPLICANT NAME, ADDRESS AND PERMIT NUMBER :

NAME; Washington County Service Authority
ADDRESS: P.O. Box 1447
Abingdon, VA 24212
PERMIT NO.: VA0087378

FACILITY NAME AND LOCATION:

NAME; Hall Creek Wastewater Treatment Plant
LOCATION: 32430 Lee Highway, Glade Spring, VA 24340

PROJECT DESCRIPTION: The Washington County Service Authority has applied for reissuance of the permit for the Hall Creek Wastewater Treatment Plant. The applicant proposes to release treated sewage wastewater into a water body at the rate of 0.63 million gallons per day (mgd) and at a future rate of 0.95 mgd when the wastewater treatment plant is expanded. The permittee proposes to release the treated sewage wastewater into Hall Creek in the Middle Fork Holston River watershed. A watershed is the land area drained by a river and its incoming streams. The permit reissuance also requires modification of the Hall Creek Total Maximum Daily Load (TMDL) of sediment and bacteria to reflect the increased total suspended solids and bacteria discharge resulting from the increase in design flow to 0.95 MGD. The permit will limit the following pollutants to amounts that protect water quality: pH, BOD_5 (oxygen demanding substances), total suspended solids, total residual chlorine, E.coli, ammonia nitrogen, and dissolved oxygen. In addition, the permit contains special conditions regarding compliance reporting, control of significant dischargers, sludge management, and other requirements and special conditions. The permittee shall conduct all sewage sludge use and disposal activities in accordance with the sludge management plan approved with the reissuance of this permit, which consists of transporting the stabilized and dewatered sludge to the BFI Carter Valley Landfill in Hawkins County, Tennessee.

MODIFICATION OF HALL CREEK TMDL: Total maximum daily load (TMDL) of sediment was developed to address benthic impairments in Hall Creek watershed. 1) The TMDL for sediment was approved by the Environmental Protection Agency on 0/28/2004 and can be found at the following website: http://www.deq.virginia.gov/tmdl/apptmdls/tenbigrvr/mfholbc.pdf. DEQ proposes to revise the sediment TMDL to accommodate changes to the original TMDL accounting used to calculate the Hall Creek water quality TMDL allocations for TSS as outlined below. 2) The TMDL for fecal coliform was approved on 02/02/2001 and can be found at the following website: http://www.deq.virginia.gov/tmdl/apptmdls/tenbigrvr/mfholstn.pdf. The bacteria and sediment TMDLs will be changed to accommodate a flow discharge rate of 0.95 million gallons per day. In addition, due to water quality standards updates, the bacteria allocation for fecal coliform will be converted to E.coli.

The Virginia Department of Environmental Quality (VDEQ) seeks written comments from interested persons on the modification of this TMDL and reissuance of the VPDES permit. Therefore, DEQ proposes to modify the sediment wasteload allocation and TMDL to accommodate this increased discharge at a permitted monthly average total suspended solids (tss) concentration of 30 mg/L at an annual loading of approximately 43.34 tons/year. DEQ proposes to modify the bacterial wasteload allocation at a permitted geometric mean E.coli concentration of 126 cfu, at an annual loading of approximately 6.20E+13 cfu /year.

This increase in suspended solids loadings from this new discharge is 0.69% or 38,452 pounds per year, of the total wasteload allocation sediment load in the TMDL for Hall Creek. The bacteria allocation will increase 0.25% of the total wasteload allocation in the TMDL for Hall Creek.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the

commenter/requester and of all the persons represented by the commenter/requester. A request for a public hearing must also include; 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit and suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION:
Name: Fred M. Wyatt
Address: DEQ, Southwest Regional Office, P.O. Box 1688, 355 Deadmore Street, Abingdon, Virginia, 24212 – 1688 ; Phone: (276) 676-4810 E-mail: frederick.wyatt@deq.virginia.gov Fax: (276) 676-4899

The public may review the draft permit and application at the DEQ office named above.

Wyatt, Frederick (DEQ)

From: Lott, Craig (DEQ)
Sent: Wednesday, February 15, 2012 2:18 PM
To: Newman, Allen (DEQ); Chapman, Martha (DEQ)
Cc: Wyatt, Frederick (DEQ); Frazier, Teresa (DEQ)
Subject: RE: Hall Creek Design Flow expansion

Good. Thank you Allen. That's what I was looking for. I'll include this information and see about an associated estimate for load reduction when we develop the final request letter.

Craig

From: Newman, Allen (DEQ)
Sent: Wednesday, February 15, 2012 2:11 PM
To: Lott, Craig (DEQ); Chapman, Martha (DEQ)
Cc: Wyatt, Frederick (DEQ); Frazier, Teresa (DEQ)
Subject: FW: Hall Creek Design Flow expansion

Hello Craig, Regarding the TMDL for Hall Creek:

WCSA proposes to serve an additional 346 homes on the attached map in the future. They cannot place a time schedule for this service at this time. But as they serve these homes, loading in the TMDL is transferred potentially from the LA to WLA.

If you consider 250 g/home/d of wastewater usage, then a potential to add 86,500 gpd to the POTW and removing some load from the LA.

From: Hoffman, Lawrence [mailto:LHoffman@chacompanies.com]
Sent: Wednesday, February 15, 2012 11:04 AM
To: Newman, Allen (DEQ); rcornett@wcsa-water.com
Cc: Wyatt, Frederick (DEQ); Frazier, Teresa (DEQ); Hudgins, Doug; Bobby Lane
Subject: RE: Hall Creek Design Flow expansion

Allen,

My apologies for the delay in getting the requested information—we needed to examine the targeted future service areas and the estimated number of residences. In answer to your question, the additional requested capacity includes anticipated additional residential flow since the WCSA plans to extend the current service area within the Hall Creek watershed to include residential areas that currently do not have service. The attached map depicts the Hall Creek watershed along with the targeted future potential residential service areas and the estimated number of residences within each. A specific time frame for extending service to these areas has not been established at this time. It is also possible that other areas may be included in the future as well.

Thank you for your patience and please don't hesitate to contact me or Robbie Cornett if you need any additional information regarding this or other items.

Lawrence

R. Lawrence Hoffman
Vice President

OLVER – A CHA Company
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540.552.5548
lhoffman@chacompanies.com
www.chacompanies.com

From: Newman, Allen (DEQ) [mailto:Allen.Newman@deq.virginia.gov]
Sent: Wednesday, February 01, 2012 8:12 AM
To: rcornett@wcsa-water.com
Cc: Hoffman, Lawrence; Wyatt, Frederick (DEQ); Frazier, Teresa (DEQ)
Subject: Hall Creek Design Flow expansion

Hello Robbie,

We are processing the Hall Creek design flow increase from 0.63 to 0.95 MGD. As stated in the justification for the increase there are 2 proposed industrial allocations that would bring the existing capacity up to 0.63. I have one question: Is any of this capacity targeted to providing sewerage service to areas in the watershed that do not have service now? If so can you advise what areas will be served?

The reason that ask is that we must modify the Hall Creek TMDL to provide allocation for this plant expansion. If you have plans to serve additional area, we might can argue that the plant expansion will remove bacterial load from failing septic systems and thereby giving that non point source load to your plant.

Thanks

Allen

Allen Newman, PE

Department of Environmental Quality

PO Box 1688

Abingdon, VA 24212

276-676-4804

Wyatt, Frederick (DEQ)

From: Hoffman, Lawrence [LHoffman@chacompanies.com]
Sent: Wednesday, February 15, 2012 11:04 AM
To: Newman, Allen (DEQ); rcornett@wcsa-water.com
Cc: Wyatt, Frederick (DEQ); Frazier, Teresa (DEQ); Hudgins, Doug; Bobby Lane
Subject: RE: Hall Creek Design Flow expansion
Attachments: Possible New Sanitary Sewer Customers.pdf

Allen,

My apologies for the delay in getting the requested information—we needed to examine the targeted future service areas and the estimated number of residences. In answer to your question, the additional requested capacity includes anticipated additional residential flow since the WCSA plans to extend the current service area within the Hall Creek watershed to include residential areas that currently do not have service. The attached map depicts the Hall Creek watershed along with the targeted future potential residential service areas and the estimated number of residences within each. A specific time frame for extending service to these areas has not been established at this time. It is also possible that other areas may be included in the future as well.

Thank you for your patience and please don't hesitate to contact me or Robbie Cornett if you need any additional information regarding this or other items.

Lawrence

R. Lawrence Hoffman
Vice President
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Thanks

Allen

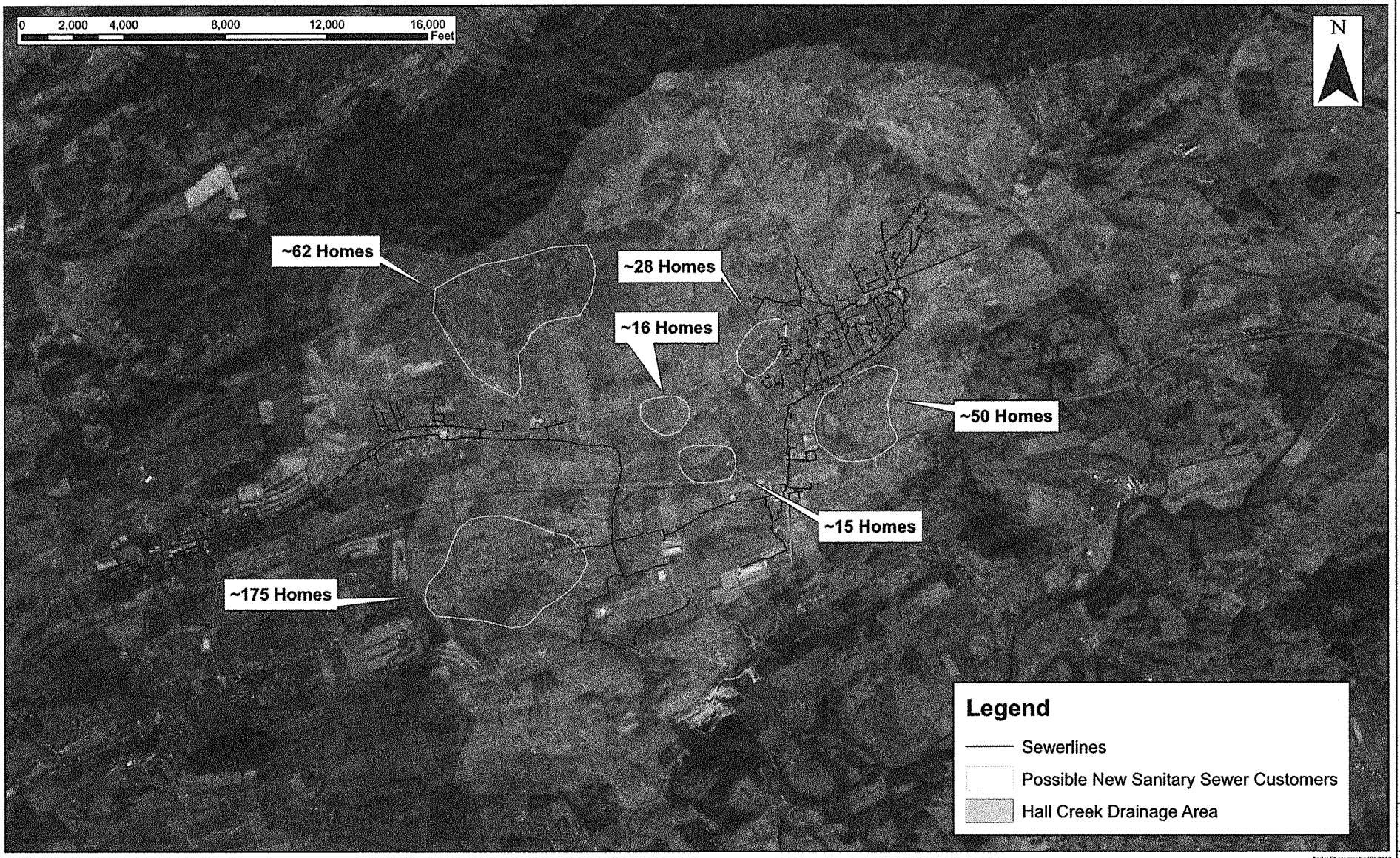
Allen Newman, PE

Department of Environmental Quality

PO Box 1688

Abingdon, VA 24212

276-676-4804



CHA

WASHINGTON COUNTY SERVICE AUTHORITY
HALL CREEK WWTP VPDES PERMIT RENEWAL

POSSIBLE NEW SANITARY SEWER CUSTOMERS IN HALL CREEK DRAINAGE AREA

Job No:
23354
FEB 2012

Figure 1

Tennessee and Big Sandy River Basins

Cause Group Code: **O05R-01-BAC** **Three Creeks**

Location: This segment includes the following tributaries to Middle Fork Holston River: Hutton, Hall, Byers, and their tributaries (Cedar Creek, West Fork Cedar Creek, East Fork Cedar Creek, Plum Creek, unnamed tributary to Hutton Creek, unnamed tributary to Hall Creek and Tattle Branch).

City / County: Washington Co.

Use(s): Recreation

Cause(s) / VA Category: Escherichia coli / 4A Fecal Coliform / 4A

Station 6CBYS000.23 had a 55% exceedance of the E.coli water quality standard and station 6CCED000.04 had a 80% exceedance of the E.coli standard. An additional station at 6CXDY000.17 had a 78% exceedance of the E. coli water quality standard. Station 6CHTO000.24 had an 80% exceedance of the E. coli standard.

Assessment Unit / Water Name / Description	Cause Category	/ Name	Cycle First Listed	TMDL Schedule	Size
VAS-O05R_BYS01A94 / Byers Creek / Byers Creek from Hall Creek and Indian Run confluence downstream to Middle Fork Holston River confluence, WQS Section 5.	4A	Escherichia coli	2006		0.49
VAS-O05R_CED01A94 / Cedar Creek / From confluence of East Fork Cedar Creek and West Fork Cedar Creek through Cedarville to Middle Fork Holston confluence, WQS Section 5.	4A	Escherichia coli	2006		6.53
VAS-O05R_HTO01A94 / Hutton Creek / Headwaters near Glade Spring downstream to Middle Fork Holston River confluence and tributaries, WQS Section 5.	4A	Escherichia coli	2006		4.79

Three Creeks	Reservoir (Acres)	River (Miles)
Escherichia coli - Total Impaired Size by Water Type:		11.81

Assessment Unit / Water Name / Description	Cause Category	/ Name	Cycle First Listed	TMDL Schedule	Size
VAS-O05R_CWF01A02 / West Fork Cedar Creek / Cedar Creek tributary west of Cedarville, section 5.	4A	Fecal Coliform	2002		1.54
VAS-O05R_ECE01A02 / Cedar Creek / Cedar Creek through Meadowview, section 5.	4A	Fecal Coliform	2002		1.88
VAS-O05R_HAL01A94 / Hall Creek / Mainstem from headwaters near Emory to Byers Creek confluence, WQS Section 5.	4A	Fecal Coliform	2002		6.80
VAS-O05R_PLU01A02 / Plum Creek / Headwaters downstream to Hutton Creek confluence, WQS Section 5.	4A	Fecal Coliform	2002		2.17
VAS-O05R_TAT01A02 / Tattle Branch / Mainstem south of Old Glade Spring from headwaters to Byers Creek confluence, WQS Section 5.	4A	Fecal Coliform	2002		2.73

Tennessee and Big Sandy River Basins

Assessment Unit / Water Name / Description	Cause Category	/ Name	Cycle First Listed	TMDL Schedule	Size
VAS-O05R_XCD01A02 / Tributary to Hutton Creek / Headwaters through Glade Spring down to Middle Fork Holston River confluence and tributaries, WQS Section 5.	4A	Fecal Coliform	2002		4.01
VAS-O05R_XCG01A02 / Hall Creek tributary / Mainstem from headwaters to Hall Creek confluence west of Patrick Henry High School, section 5.	4A	Fecal Coliform	2002		1.68

Three Creeks	Reservoir (Acres)	River (Miles)
Fecal Coliform - Total Impaired Size by Water Type:		20.81

Sources:

- Animal Feeding Operations (NPS)
- Crop Production (Crop Land or Dry Land)
- Grazing in Riparian or Shoreline Zones
- Livestock (Grazing or Feeding Operations)
- Unrestricted Cattle Access

Tennessee and Big Sandy River Basins

Cause Group Code: **O05R-01-BEN** **Three Creeks**

Location: This segment includes the following tributaries to Middle Fork Holston River: Hutton, Hall Byers, and their tributaries (Cedar Creek, West Fork Cedar Creek, East Fork Cedar Creek, Plum Creek, unnamed tributary to Hutton Creek, unnamed tributary to Hall Creek, Tattle Branch).

City / County: Washington Co.

Use(s): Aquatic Life

Cause(s) / VA Category: Benthic-Macroinvertebrate Bioassessments / 4A Sedimentation/Siltation

The following biological stations were found to be impaired based on their VSCI scores being lower than 60: 6CTAT000.50, 6CCED000.04, 6CHTO000.07 and 6CBYS000.08.

Assessment Unit / Water Name / Description	Cause Category	/ Name	Cycle First Listed	TMDL Schedule	Size
VAS-O05R_BYS01A94 / Byers Creek / Byers Creek from Hall Creek and Indian Run confluence downstream to Middle Fork Holston River confluence, WQS Section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		0.49
VAS-O05R_CED01A94 / Cedar Creek / From confluence of East Fork Cedar Creek and West Fork Cedar Creek through Cedarville to Middle Fork Holston confluence, WQS Section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		6.53
VAS-O05R_CWF01A02 / West Fork Cedar Creek / Cedar Creek tributary west of Cedarville, section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		1.54
VAS-O05R_ECE01A02 / Cedar Creek / Cedar Creek through Meadowview, section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		1.88
VAS-O05R_HAL01A94 / Hall Creek / Mainstem from headwaters near Emory to Byers Creek confluence, WQS Section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		6.80
VAS-O05R_HTO01A94 / Hutton Creek / Headwaters near Glade Spring downstream to Middle Fork Holston River confluence and tributaries, WQS Section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		4.79
VAS-O05R_PLU01A02 / Plum Creek / Headwaters downstream to Hutton Creek confluence, WQS Section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		2.17
VAS-O05R_TAT01A02 / Tattle Branch / Mainstem south of Old Glade Spring from headwaters to Byers Creek confluence, WQS Section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		2.73
VAS-O05R_XCD01A02 / Tributary to Hutton Creek / Headwaters through Glade Spring down to Middle Fork Holston River confluence and tributaries, WQS Section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		4.01
VAS-O05R_XCG01A02 / Hall Creek tributary / Mainstem from headwaters to Hall Creek confluence west of Patrick Henry High School, section 5.	4A	Benthic-Macroinvertebrate Bioassessments	2004		1.68

Tennessee and Big Sandy River Basins

Three Creeks

	Reservoir (Acres)	River (Miles)
Benthic-Macroinvertebrate Bioassessments - Total Impaired Size by Water Type:		32.62

Assessment Unit / Water Name / Description	Cause Category	/ Name	Cycle First Listed	TMDL Schedule	Size
VAS-O05R_CED01A94 / Cedar Creek / From confluence of East Fork Cedar Creek and West Fork Cedar Creek through Cedarville to Middle Fork Holston confluence, WQS Section 5.	4A	Sedimentation/Siltation	2010		6.53
VAS-O05R_CWF01A02 / West Fork Cedar Creek / Cedar Creek tributary west of Cedarville, section 5.	4A	Sedimentation/Siltation	2010		1.54
VAS-O05R_ECE01A02 / Cedar Creek / Cedar Creek through Meadowview, section 5.	4A	Sedimentation/Siltation	2010		1.88
VAS-O05R_HAL01A94 / Hall Creek / Mainstem from headwaters near Emory to Byers Creek confluence, WQS Section 5.	4A	Sedimentation/Siltation	2010		6.80
VAS-O05R_HTO01A94 / Hutton Creek / Headwaters near Glade Spring downstream to Middle Fork Holston River confluence and tributaries, WQS Section 5.	4A	Sedimentation/Siltation	2010		4.79
VAS-O05R_TAT01A02 / Tattle Branch / Mainstem south of Old Glade Spring from headwaters to Byers Creek confluence, WQS Section 5.	4A	Sedimentation/Siltation	2010		2.73
VAS-O05R_XCD01A02 / Tributary to Hutton Creek / Headwaters through Glade Spring down to Middle Fork Holston River confluence and tributaries, WQS Section 5.	4A	Sedimentation/Siltation	2010		4.01
VAS-O05R_XCG01A02 / Hall Creek tributary / Mainstem from headwaters to Hall Creek confluence west of Patrick Henry High School, section 5.	4A	Sedimentation/Siltation	2010		1.68

Three Creeks

	Reservoir (Acres)	River (Miles)
Sedimentation/Siltation - Total Impaired Size by Water Type:		29.96

Sources:

- Animal Feeding Operations (NPS)
- Crop Production (Crop Land or Dry Land)
- Grazing in Riparian or Shoreline Zones
- Livestock (Grazing or Feeding Operations)
- Unrestricted Cattle Access

Existing 01/19/2012

Type	PermitNo	FacilityNm	Design Flow	ReceivingStrm	TSS	Area (ac)	Area (m2)	Runoff (cm/yr)	Runoff (m/yr)	Flow/area (m3/yr)	Flow (liters/yr)	TSS (mg/yr)	TSS (kg/yr)	TSS (tons/yr)	TSS (lbs/yr)	
Ind.	VA0087378	Hall Creek WWTP	630000	Hall Creek	30						869211000	26076330000.0	26076.33	28.74423351	57488.47	
Ind.																
Ind.																
Ind.																
Ind.																28.74
READYMX																
READYMX																
READYMX																
READYMX																
READYMX																0.00
D-SFH																
D-SFH																
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NMMM	VAG840153	Mountain Materials - Glade Stone Plant		Tattle Branch	30	81.69	330599.43000	45.9	0.0459	15174.51384	15174513.84	455235415.1	455	0.50	1003.62	
NMMM																
NMMM																0.50
SWIND	VAR052033	Larrys Auto Parts Inc		Indian Run, ut	100	1.00	4047.00000	72.54	0.7254	2935.6938	2935693.8	293569380.0	294	0.32	647.21	
SWIND	VAR050748	Utility Trailer Manufacturing Company - Glade		Tattle Branch, ut	100	1.00	4047.00000	72.54	0.7254	2935.6938	2935693.8	293569380.0	294	0.32	647.21	
SWIND	VAR050748	Utility Trailer Manufacturing Company - Glade		Tattle Branch, ut	100	1.00	4047.00000	72.54	0.7254	2935.6938	2935693.8	293569380.0	294	0.32	647.21	
SWIND																
SWIND																
SWIND																
SWIND																
SWIND																0.97
DCR Const.	DCR01-09-100463	Ramirez Contracting, LLC		Hall Creek	685	4.50	18211.50000	45.9	0.459	8359.0785	8359078.5	5725968772.5	5726	6.31	12623.60	
DCR Const.	DCR01-08-101831	Byrd Properties		Hall Creek	685	1.40	5665.80000	45.9	0.459	2600.6022	2600602.2	1781412507.0	1781	1.96	3927.34	
DCR Const.	DCR01-08-101701	Clough Harbour and Associates, LLP		Hall Creek	685	4.50	18211.50000	45.9	0.459	8359.0785	8359078.5	5725968772.5	5726	6.31	12623.60	
DCR Const.	DCR01-06-100536	W-L Construction and Paving, Inc.		Hall Creek	685	7.90	31971.30000	45.9	0.459	14674.8267	14674826.7	10052256289.5	10052	11.08	22161.43	
DCR Const.	DCR01-07-102319	J.A. Street & Associates		Hall Creek	685	1.31	5301.57000	45.9	0.459	2433.42063	2433420.63	1666893131.6	1667	1.84	3674.87	
DCR Const.	DCR01-05-100447	J.A. Street & Associates		Hall Creek	685	9.70	39255.90000	45.9	0.459	18018.4581	18018458.1	12342643798.5	12343	13.61	27210.87	
DCR Const.	DCR01-09-101091	Crosspointe Contracting, Inc.		Hall Creek	685	5.00	20235.00000	45.9	0.459	9287.865	9287865	6362187525.0	6362	7.01	14026.22	
DCR Const.	VAR10-11-1-3-06	VDOT, Lebanon Residency, Washington County		Hall Creek	685	2.20	8903.40000	45.9	0.459	4086.6606	4086660.6	2799362511.0	2799	3.09	6171.54	
DCR Const.	VAR10-11-1-3-11	VDOT, Lebanon Residency, Washington County		Hall Creek	685	1.40	5665.80000	45.9	0.459	2600.6022	2600602.2	1781412507.0	1781	1.96	3927.34	
DCR Const.	DCR01-06-1-1-4	VDOT, Washington County		Hall Creek	685	1.00	4047.00000	45.9	0.459	1857.573	1857573	1272437505.0	1272	1.40	2805.24	
DCR Const.	VAR10-10-103791	J.A. Street & Associates		Hall Creek	685	8.67	35087.49000	45.9	0.459	16105.15791	16105157.91	11032033168.4	11032	12.16	24321.47	
DCR Const.	VAR10-10-104845	Price Buildings, Inc.		Hall Creek	685	1.20	4856.40000	45.9	0.459	2229.0876	2229087.6	1526925006.0	1527	1.68	3366.29	
DCR Const.	VAR10-10-104151	BurWill Construction Company, Inc.		Hall Creek	685	1.20	4856.40000	45.9	0.459	2229.0876	2229087.6	1526925006.0	1527	1.68	3366.29	
DCR Const.	VAR10-11-10020	BurWill Construction Company, Inc.		Hall Creek	685	3.00	12141.00000	45.9	0.459	5572.719	5572719	3817312515.0	3817	4.21	8415.73	
DCR Const.	VAR10-11-101530	Appalachian Electric Power		Hall Creek	685	35.00	141645.00000	45.9	0.459	65015.055	65015055	44535312675.0	44535	49.09	98183.56	
DCR Const.	VAR10-11-101024	Classic City Mechanical, Inc.		Hall Creek	685	8.40	33994.80000	45.9	0.459	15603.6132	15603613.2	10688475042.0	10688	11.78	23564.05	
DCR Const.	VAR10-12-100261	Emory & Henry College		Hall Creek	685	3.10	12545.70000	45.9	0.459	5758.4763	5758476.3	3944556265.5	3945	4.35	8696.26	
PETROL																
PETROL																
PETROL																139.53

Individual	28.74	57488.47	lb/yr
Concrete	0.00	0.00	lb/yr
General Residences	0.000	0.00	lb/yr
Mine/Quarries	0.50	1003.62	lb/yr
Industrial	0.97	1941.63	lb/yr
Construction Sites	139.53		lb/yr
Petrol		0.00	lb/yr
Allocated all Pemits	169.75	60433.72	lb/yr

Published Original	TMDL	5,564,960.98	lb/yr
Published Original	LA	4,964,969.22	lb/yr
Published Original	WLA	48,236.08	lb/yr
Published Original	MOS	551,755.68	lb/yr

Decision Rationale

**Total Maximum Daily Loads for
the Aquatic Life Use Impairments on Cedar Creek,
Hall/Byers Creek, and Hutton Creek**

I. Introduction

The Clean Water Act (CWA) requires a Total Maximum Daily Load (TMDL) be developed for those water bodies identified as impaired by a state where technology-based and other controls will not provide for attainment of water quality standards. A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources, including a margin of safety (MOS), that may be discharged to a water quality-limited water body.

This document will set forth the Environmental Protection Agency's (EPA) rationale for approving the TMDLs for the aquatic life use (benthic) impairments on Cedar Creek, Hall/Byers Creek, and Hutton Creek. EPA's rationale is based on the determination that the TMDLs meet the following eight regulatory conditions pursuant to 40 CFR §130.

1) The TMDLs are designed to implement applicable water quality standards.
2) The TMDLs include a total allowable load as well as individual waste load allocations and load allocations.
3) The TMDLs consider the impacts of background pollutant contributions.
4) The TMDLs consider critical environmental conditions.
5) The TMDLs consider seasonal environmental variations.
6) The TMDLs include a margin of safety.
7) There is reasonable assurance that the TMDLs can be met.
8) The TMDLs have been subject to public participation.

II. Background

The Cedar, Hall/Byers, and Hutton Creek watersheds are located in Washington County, Virginia. They are all tributaries of the Middle Fork Holston River which is located within the Tennessee Big Sandy River basin. The watersheds are relatively small, each is less than 10,000 acres. The impaired segments for each of the streams originates at its headwaters and terminates upon its confluence with the Middle Fork Holston. Cedar Creek has a 4,629-acre watershed and is 9.98 miles in length. Hall/Byers Creek has a watershed area of 9,991-acres and is 11.72 miles in length. Hutton Creek has a 7,149-acre watershed and is 10.89 miles in length. Agricultural lands make up the majority of the lands within each watershed. Seventy-nine percent of the Cedar Creek watershed is

composed of agricultural lands, the remainder of the watershed is split between urban (13%) and forested (8%) lands. Sixty-six percent of the Hall/Byers watershed is composed of agricultural lands with the remaining lands divided between urban (13%) and forested (20%) lands. The Hutton Creek watershed is also dominated by agricultural (66%) lands with the remainder of the watershed composed of urban (10%) and forested (23%) lands.

In response to Section 303(d) of the CWA, the Virginia Department of Environmental Quality (VADEQ) listed Cedar, Hall/Byers, and Hutton Creek (VAS-O05R) on Virginia's 1998 Section 303(d) list as being unable to attain the general standard for the aquatic life use and the bacteriological criteria for the primary contact use. The bacteriological (fecal coliform) impairments were addressed by TMDLs developed in 2001. Virginia has developed implementation plans for the fecal coliform TMDLs and is in the process of implementing these plans. This decision rationale will address the TMDLs for the impairment of the general standard for the aquatic life use. The failure to attain this use was determined through biological assessments of the benthic macroinvertebrate community.

Virginia's 305(b)/303(d) guidance states that support of the aquatic life beneficial use is determined by the assessment of conventional pollutants (dissolved oxygen, pH, and temperature); toxic pollutants in the water column, fish tissue, and sediments; and biological evaluation of benthic community data.[1] Therefore, a biological assessment of the benthic community can be used to determine a stream's compliance with the state's general standard for the aquatic life use. Virginia uses EPA's Rapid Bioassessment Protocol II (RBPII) to determine status of a stream's benthic macroinvertebrate community.[2] This approach evaluates the benthic macroinvertebrate community between a monitoring site and its reference station. Measurements of the benthic community, called metrics, are used to identify differences between monitored and reference stations.[3] Please note that the state is currently in the process of changing this methodology to a stream condition index (SCI) approach.

As part of the RBPII approach, reference stations are established on streams which are minimally impacted by humans and have a healthy benthic community. These reference stations represent the desired community for the monitored sites. Monitored sites are evaluated as non-impaired, slightly impaired, moderately impaired, or severely impaired based on a comparison of the biological community of the reference and monitored sites. Streams that are classified as moderately (after a confirmatory assessment) or severely impaired after an RBPII evaluation are classified as

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[1]VADEQ. 1997. 1998 Water Quality Assessment Guidance for 305(b) Water Quality Report and 303(d) TMDL Priority List Report. Richmond, VA.

[2]Tetra Tech 2002. Total Maximum Daily Load (TMDL) Development for Blacks Run and Cooks Creek. Fairfax, Virginia.

[3]Ibid 2

impaired and are placed on the Section 303(d) list of impaired waters. During the 1998 assessment period, Cedar, Hall/Byers, and Hutton Creek (Three Creeks) were identified as being moderately impaired. Water quality appears to have improved on these streams probably as a result of the restoration/remediation efforts occurring within the watersheds associated with the previous TMDL. When evaluating these streams under the SCI approach their scores indicate a minimal impairment exists.

The RBPII assesses the health of the macroinvertebrate community of a stream. The analysis will inform the biologist if the stream's benthic community is impaired. However, it will not inform the biologist as to what is causing the degradation of the benthic community. Additional analysis is required to determine the pollutants which are causing the impairment. TMDL development requires the identification of impairment causes and the establishment of numeric endpoints that will allow for the attainment of designated uses and water quality criteria.[4] A reference watershed approach was used to determine the stressors and the endpoints for the Three Creeks TMDLs. Numeric endpoints represent the water quality goals that are to be achieved through the implementation of the TMDLs which will allow the Three Creeks to attain their designated uses. A reference watershed approach is based on selecting a non-impaired watershed that shares similar land use, ecoregion, and geomorphological characteristics with the impaired watershed. The stream conditions and loadings in the reference stream are assumed to be the conditions needed for the impaired stream to attain standards.

To determine whether a stream was a suitable reference site for the monitored sites, the modelers evaluated the topography, soils, ecoregion, land uses, watershed size, and point source inventory of the potential reference site. All reference site candidates were evaluated as nonimpaired in the biomonitoring analysis. The reference site selected for the Three Creeks TMDL was Walker Creek. Walker Creek was evaluated as unimpaired when using both the RBP II or SCI approach.

The next step in the TMDL development process was to determine the loadings and stressors in the monitored and reference watersheds. Low dissolved oxygen (DO), sedimentation, habitat modification, nutrients, and toxic pollutants were evaluated as possible stressors to the monitored streams. Ambient water quality monitoring (AWQM) on the streams documented temperature, DO, pH, turbidity, total suspended solids (TSS), nitrogen, and phosphorous. To get a better understanding of the DO concentrations during the most critical periods, an early morning sampling was conducted on August 29, 2003. Samples were collected from each of Three Creeks between 5:30 and 6:00 a.m. These samples were taken at the end of the summer season when the lowest DO concentrations are expected to be found due to a combination of high water temperatures (lower solubility of oxygen) and low flows. They were also collected prior to dawn when photosynthesis commences and DO levels increase. All of the samples collected during this period had DO concentrations in compliance with the applicable criteria.

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[4]Ibid 2

Toxicity testing was also conducted for water samples collected from the Three Creeks. The testing compared the survival and reproduction rates or fathead minnows (Pimephales promelas) and water fleas (Ceriodaphnia dubia) in water collected from the impaired sites with an unimpaired water source. The test did not document any statistically significant effects associated with fathead minnows or water fleas reared in water from the Three Creeks. After this analysis, toxicity was not viewed as an issue on the monitored sites.

In general, the Three Creeks had poorer water quality than Walker Creek, please see Section 3.0 of the report for additional information on these results. Therefore, several stressors were seen as possible causes or contributors to the benthic impairment on the Three Creeks. However, after reviewing the benthic and water quality data it was determined that excessive sediment was the most possible stressor. Therefore, the TMDLs were developed to control sediment, the controls needed to address this problem will limit the amounts of nutrients to the Three Creeks as well. It should be noted again that based on the SCI results the biological community on these streams is being minimally impacted as a result of the best management practices (BMPs) that have already been put in place as a result of previous TMDL efforts.

The next step in developing these TMDLs was to determine the sediment (the stressor) loadings to the monitored and reference segments. The Generalized Watershed Loading Functions (GWLF) model was selected as the means to determine loadings to the streams. The GWLF model provides the ability to simulate runoff, sediment, and nutrient loadings from watersheds given variable source areas (e.g., agricultural, forested, and developed land).[5] GWLF is a continuous simulation model that uses daily time steps for weather data and water balance calculations.[6] Calculations are made for sediment based on daily water balance totals that are summed to give monthly values. To equate the reference watershed with the monitored watersheds, the reference watershed was decreased in size to that of the impaired watersheds in the model, the land uses were proportionally decreased based on the percent land use distribution. Therefore, the land use breakdown in the reference watershed remained constant.

Local rainfall and temperature data were needed to simulate the hydrology. The Wytheville (precipitation) and Bristol (temperature) weather stations were used for these TMDLs. To insure that the models accurately predicted the stream flow the modeled flow results were compared to the observed flows, a process known as calibration. The models' parameters were adjusted based on these results to insure the most accurate representation of the system. The Three Creeks were modeled to the flow on a United States Geological Survey (USGS) gage in the Middle Fork Holston River. Walker Creek was modeled to a USGS gage within its watershed. Walker Creek was modeled from April of 1980 through March of 2000. The model was driven by data collected at the

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[5]Ibid 2

[6]Ibid 2

two weather stations over the same period of time. The Three Creeks were modeled to flow data collected from April of 1988 through March of 1989. The results of the models are documented in Section 5.0 of the report. Table 1 documents the TMDL allocations to the Three Creeks.

Table 1 - Summarizes the Sediment Allocations for the Three Creeks TMDLs.

Segment	TMDL (lbs/yr)	WLA (lbs/yr)	LA (lbs/yr)	MOS (lbs/yr)*
Cedar Creek	3,071,470	1,789	2,762,560	307,121
Hall/Byers Creek	5,526,021	57,533	4,916,733	551,755
Hutton Creek	4,306,282	91	3,875,474	430,717

* Virginia includes an explicit MOS by reserving the 10 percent of total loading to the MOS.

The United States Fish and Wildlife Service has been provided with copy of this TMDL.

III. Discussion of Regulatory Conditions

EPA finds that Virginia has provided sufficient information to meet all of the eight basic requirements for establishing aquatic life use (benthic) impairment TMDLs for the Three Creeks. EPA is therefore approving these TMDLs. EPA's approval is outlined according to the regulatory requirements listed below.

1) The TMDLs are designed to meet the applicable water quality standards.

The Three Creeks were listed as impaired due to a degradation of their benthic macroinvertebrate communities. As mentioned above, benthic assessments inform the biologist of an impairment, but they are unable to identify a stressor. Therefore, a reference watershed approach was used to identify the stressors to these streams. Virginia has indicated that excessive levels of sediment have caused the degradation of the benthic communities in the Three Creeks. The Commonwealth does not have numeric standards for sediment at this time. Therefore, the loading obtained from the reference watershed was used as the endpoint for these TMDLs. Its believed that if the streams can reduce their sediment loadings to that of the area weighted reference watershed, the impairment to the benthic communities will be relieved.

The GWLF model was used to determine the loading rates of sediment to the stream from all point and nonpoint sources. The TMDL modelers determined the sediment loading rates within each watershed. Data used in the model was obtained on a wide array of items, including land uses in the area, point sources in the watershed, weather, stream geometry, etc..

The GWLF model provides the ability to simulate runoff and sediment loadings from

watersheds given variable source areas (e.g., agricultural, forested, and developed land). GWLF is a continuous simulation model that uses daily time steps for weather data and water balance calculations.[7] To equate the reference watershed with the monitored watersheds, the reference watershed was decreased in size to that of the impaired stream in the model. Each land-use was decreased in equal proportion, insuring that the land use breakdown in the reference watershed remained constant. Local rainfall and temperature data were needed to simulate the hydrology, this data was obtained from the Wytheville and Bristol weather stations. In the GWLF model, the nonpoint source load calculation is affected by terrain conditions, such as the amount of agricultural land, land slope, soil erodibility, and farming practices used in the area.[8] Parameters within the model account for these conditions and practices. Since there were flow gages within the impaired and reference watersheds, the hydrology component of the model was calibrated to observed flow data.

EPA believes that using GWLF to model and allocate the sediment loadings to the Three Creeks will ensure the attainment of the designated uses and water quality standards on these streams. Several BMPs have already been put in place within the watershed in association with the Implementation Plan for the Fecal Coliform TMDL. These BMPs which are geared to remove cattle from the stream have alleviated some of the sedimentation problems within the streams as observed via the recent benthic assessments. The Three Creeks TMDLs did not account for the BMPs and therefore a portion of the reductions called for in the TMDLs are in all likelihood already be in place.

2) The TMDLs include a total allowable load as well as individual waste load allocations and load allocations.

Total Allowable Loads

Virginia indicates that the total allowable loading is the sum of the loads allocated to land based precipitation driven nonpoint source areas (forest and agricultural land segments) and point sources. Activities that increase the levels of nutrients and sediment to the land surface or their availability to runoff are considered flux sources. The actual value for total loading can be found in Table 1 of this document. The total allowable load is calculated on an annual basis.

Waste Load Allocations

Virginia has stated that there are four regulated point sources discharging to the Three Creeks. Three of the four facilities are small, discharging less than twenty thousands gallons of effluent per day (gpd). One of the facilities, Emory Meadowview Waste Water Treatment Plant (WWTP), is permitted to discharge 630,000 gpd. The WLAs can be determined by multiplying the permitted flow by the

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[7]Ibid 2

[8]Ibid 2

permitted pollutant concentration. The WLAs are the maximum allowable amount of sediment which may be discharged in all likelihood the actual discharge should be lower. Since facilities often discharge at lower rates and concentrations than what is provided in the permit.

EPA regulations require that an approvable TMDL include individual waste load allocations (WLAs) for each point source. According to 40 CFR 122.44(d)(1)(vii)(B), "Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA pursuant to 40 CFR 130.7." Furthermore, EPA has authority to object to the issuance of any National Pollutant Discharge Elimination System (NPDES) permit that is inconsistent with the WLAs established for that point source.

Table 2a - TSS WLAs for the Three Creek

Stream	Facility	Permit Number	Permitted Flow (gpd)	Permitted Concentration (mg/L)	TSS Load
Cedar Creek	Meadowview Elementary School	VA0030589	16,000	30 mg/L	1,461
Cedar Creek	Dillow's Shop and Wash	VA0071366	4,000	30 mg/L	328
Hall/Byers Creek	Emory-Meadowview WWTP	VA0087378	630,000	30 mg/L	57,533
Hutton Creek	SFH STP	VAG400181	1,000	30 mg/L	91

Load Allocations

According to Federal regulations at 40 CFR 130.2(g), load allocations (LAs) are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting loading. Wherever possible, natural and nonpoint source loads should be distinguished.

In order to accurately simulate landscape processes and nonpoint source loadings, VADEQ used the GWLF model to represent the impaired watersheds. The GWLF model is a comprehensive modeling system for the simulation of watershed hydrology, point and nonpoint source loadings, and receiving water quality. GWLF uses precipitation data for continuous and storm event simulation to determine total loading to the impaired segments from the various land uses within the watershed. Many BMPs have been implemented in the Three Creeks watershed as a result of the Implementation Plan for the Fecal Coliform TMDLs. The BMPs were not written into the GWLF model. The sediment loadings to the Three Creeks represents pre BMP conditions. Table 3 provides the LA for all

of the nonpoint sources.

Table 3 - LA for Sediment for Three Creeks

	Cedar Creek		Hall/Byers Creek		Hutton Creek	
Land Use	LA Sediment (lbs/yr)	Percent Reduction	LA Sediment (lbs/yr)	Percent Reduction	LA Sediment (lbs/yr)	Percent Reduction
Cropland	1,750,145	38.2	2,487,659	34	1,805,246	26
Pasture/Hay	999,621	36.2	2,427,982	33.8	2,069,314	25
Transitional	12,172	0.5	0.0	0.0	0.0	0.0
Forest	19.6	0.0	91.4	0.0	75.6	0.0
Urban	602.6	0.5	1,000.4	0.02	839.2	0.5
Total	2,762,560		4,916,733		3,875,474	

3) The TMDLs consider the impacts of background pollution.

The reference watershed approach inherently considers the impact of background pollutants by considering the sediment load from all land uses, including forested lands, within the impaired and reference watersheds. The TMDL is developed to attain the loading seen in the reference watershed which has a load from natural sources.

4) The TMDLs consider critical environmental conditions.

According to EPA's regulation 40 CFR 130.7 (c)(1), TMDLs are required to take into account critical conditions for stream flow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of the Three Creeks is protected during times when it is most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be

undertaken to meet water quality standards[9]. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of occurrence. In specifying critical conditions in the waterbody, an attempt is made to use a reasonable "worst-case" scenario condition. For example, stream analysis often uses a low-flow (7Q10) design condition when the ability of the waterbody to assimilate pollutants without exhibiting adverse impacts is at a minimum.

The GWLF model was run over a multi-year period for the reference watershed to insure that it accounted for wide range of climatic conditions within the reference watershed. The allocations developed in the TMDL will therefore insure that the criteria is attained over a wide range of environmental conditions.

5) The TMDLs consider seasonal environmental variations.

Seasonal variations involve changes in stream flow and loadings as a result of hydrologic and climatological patterns. In the continental United States, seasonally high flows normally occur in early spring from snow melt and spring rain, while seasonally low flows typically occur during the warmer summer and early fall drought periods. Pollutant loadings also change during the year as vegetation grows making it more difficult for sediments to runoff. Consistent with the discussion regarding critical conditions, the GWLF model and TMDL analysis effectively considered seasonal environmental variations through the use of observed weather data over an extended period of time and modifying the soil loss equations based on the time of the year.

6) The TMDLs include a margin of safety.

This requirement is intended to add a level of safety to the modeling process to account for any uncertainty. The MOS may be implicit, built into the modeling process by using conservative modeling assumptions, or explicit, taken as a percentage of the WLA, LA, or TMDL. Virginia includes an explicit MOS by allocating 10 percent of the total TMDL loading to the MOS.

7) There is a reasonable assurance that the TMDLs can be met.

EPA requires that there be a reasonable assurance that the TMDL can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the state and

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[9]EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

approved by EPA. Furthermore, EPA has authority to object to issuance of an NPDES permit that is inconsistent with WLAs established for that point source.

Nonpoint source controls to achieve LAs can be implemented through a number of existing programs such as Section 319 of the CWA, commonly referred to as the Nonpoint Source Program.

The TMDL in its current form is designed to meet the applicable water quality standards. The Commonwealth intends to implement this TMDL through best management practices (BMPs). The implementation of these practices will occur in stages. This will allow the Commonwealth to monitor the benefits of the BMPs and determine which practices have the greatest impacts on water quality. It will also provide a mechanism for developing public support and checking the accuracy of the model. The success exhibited in the implementation of the fecal coliform TMDL and the improvement seen in the benthic community as a result of this effort, demonstrates the communities willingness to improve water quality through the implementation of BMPs.

8) The TMDLs have been subject to public participation.

The first public meeting was held on January 27, 2003 at Patrick Henry High School in Glade Spring, Virginia. The second meeting was held at the same location on September 23, 2003. Information was added to the TMDL regarding the adoption of BMPs in the watershed as a result of comments received during the second meeting.

Decision Rationale

Total Maximum Daily Load of
Fecal Coliform for Byers Creek and Hall Creek

I. Introduction

This document will set forth the Environmental Protection Agency's (EPA) rationale for approving the Total Maximum Daily Load (TMDL) of Fecal Coliform for Hall Creek and Byers Creek submitted for final Agency review on January 04, 2001 Our rationale is based on the TMDL submittal document to determine if the TMDL meets the following 8 regulatory conditions pursuant to 40 CFR §130.

1. The TMDLs are designed to implement applicable water quality standards.
2. The TMDLs include a total allowable load as well as individual waste load allocations and load allocations.
3. The TMDLs consider the impacts of background pollutant contributions.
4. The TMDLs consider critical environmental conditions.
5. The TMDLs consider seasonal environmental variations.
6. The TMDLs include a margin of safety.
7. The TMDLs have been subject to public participation.
8. There is reasonable assurance that the TMDLs can be met.

II. Background

Located in Washington County, Virginia, the overall Byers/Hall Creek watershed[1] is approximately 15.7 square miles. The TMDL addresses 5.87 miles of Hall Creek, from its headwaters to its confluence with Byers Creek, and 1.19 miles of stream from the confluence with Hall Creek to its confluence with the Middle Fork Holston. The Middle Fork Holston flows from southern Virginia to Tennessee.

In response to Section 303 (d) of the Clean Water Act (CWA), the Virginia Department of Environmental Quality (VADEQ) listed 1.19 miles of Byers Creek and 5.87 of Hall Creek as being impaired by elevated levels of fecal coliform on Virginia's 1998 303 (d) list. Hall and Byers Creek were both listed for violations of Virginia's fecal coliform bacteria standard for primary contact. These Creeks were listed as being benthically impaired as well. Fecal Coliform is a bacterium which can be found within the intestinal tract of all warm blooded animals. Therefore, fecal coliform can be found in the fecal wastes of all warm blooded animals. Fecal coliform in itself is not a pathogenic organism. However, fecal coliform indicates the presence of fecal wastes and the potential for the existence of other pathogenic bacteria. The higher concentrations of fecal coliform indicate the elevated likelihood of increased pathogenic organisms. Byers Creek identified as watershed VAS-O05R, was given a high priority for

[1]The Hall/Byers Creek watershed is part of Middle Fork Holston hydrologic unit (No. 2070005)

TMDL development. Hall Creek identified as watershed VAS-O05 was given a high priority as well. Section 303 (d) of the Clean Water Act and its implementing regulations require a TMDL to be developed for those waterbodies identified as impaired by the State where technology-based and other controls do not provide for the attainment of Water Quality Standards. The TMDL submitted by Virginia is designed to determine the acceptable load of fecal coliform which can be delivered to Byers Creek and Hall Creek, as demonstrated by the Hydrologic Simulation Program Fortran (HSPF)[2], in order to ensure that the water quality standard is attained and maintained. These levels of fecal coliform will ensure that the Primary Contact usage is supported. HSPF is considered an appropriate model to analyze this watershed because of its dynamic ability to simulate both watershed loading and receiving water quality over a wide range of conditions.

The TMDL analysis allocates the application/deposition of fecal coliform to land based and instream sources. For land based sources, the HSPF model accounts for the buildup and washoff of pollutants from these areas. Buildup (accumulation) refers to all of the complex spectrum of dry-weather processes that deposit or remove pollutants between storms.[3] Washoff is the removal of fecal coliform which occurs as a result of runoff associated with storm events. These two processes allow the HSPF model to determine the amount of fecal coliform from land based sources which is reaching the stream. Point sources and wastes deposited directly to the stream were treated as direct deposits. These wastes do not need a transport mechanism to allow them to reach the stream. The allocation plan calls for the reduction in fecal coliform wastes delivered by cattle in-stream and septic systems. The waste load allocation in Table 1 is given as a daily load. In order to determine the annual waste load allocation, please multiply the WLA by 365 days. The annual waste load allocation for Hall/Byers Creek is 7.85E+10 cfu/year.

Table #1 summarizes the specific elements of the Hall/Byers Creek TMDL.

Parameter	TMDL(cfu/yr)	*WLA*[1] (cfu/day)	LA(cfu/yr)	*MOS*[2] (cfu/yr)
Fecal Coliform	1.03×10^{15}	2.15×10^{8}	9.83×10^{14}	5.17×10^{13}

1 This loading is a daily value. In order to determine the annual loading please multiply the WLA by 365 days which equals 7.85×10^{10}

Virginia includes an implicit MOS by identifying the TMDL target as achieving the total fecal coliform water quality concentration of 190 cfu/100ml as opposed to the WQS of 200 cfu/ml. This can be viewed explicitly as a 5% MOS.

The United States Fish and Wildlife Service has been provided with a copy of this TMDL.

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[2]Bicknell, B.R., J.C. Imhoff, J.L. Little, and R.C. Johanson. 1993. Hydrologic Simulation Program-FORTRAN (HSPF): User's Manual for release 10.0. EPA 600/3-84-066. U.S. Environmental Protection Agency, Environmental Research Laboratory, Athens, GA.
[3]CH2MHILL, 2000. Fecal Coliform TMDL Development for Cedar, Hall, Byers, and Hutton Creeks Virginia,

III. Discussion of Regulatory Conditions

EPA finds that Virginia has provided sufficient information to meet all of the 8 basic requirements for establishing a fecal coliform TMDL for Hall and Byers Creek. EPA is therefore approving this TMDL. Our approval is outlined according to the regulatory requirements listed below.

1) The TMDL is designed to meet the applicable water quality standards.

Virginia has indicated that excessive levels of fecal coliform due to nonpoint sources (directly deposited into the Creek) have caused violations of the water quality standards and designated uses on Hall and Byers Creek. The water quality criterion for fecal coliform is a geometric mean 200 cfu (colony forming units)/100ml or an instantaneous standard of no more than 1,000 cfu/100ml. Two or more samples over a 30-day period are required for the geometric mean standard. Most of the streams monitored by Virginia are sampled once in a 30-day period. Therefore, most violations of the State's water quality standard are due to violations of the instantaneous standard.

The HSPF model is being used to determine the fecal coliform deposition rates to the land as well as loadings to the stream from point and other direct deposit sources necessary to support the fecal coliform water quality criterion and primary contact use. The following discussion is intended to describe how controls on the loading of fecal coliform to Hall and Byers Creek will ensure that the criterion is attained.

The TMDL modelers determined the fecal coliform production rates within the watershed. Information was attained from a wide array of sources on the farm practices in the area (land application rates of manure), the amount and concentration of farm animals, point sources in the watershed, animal access to the stream, wildlife in the watershed and their fecal production rates, land uses, weather, stream geometry, etc. This information was put into the model. The modelers also assigned values to several parameters that affect the transport of fecal coliform to the stream. The modelers adjusted the parameters to insure a correspondence between observed and simulated conditions

The hydrology component of the model for all the Middle Fork Holston TMDLs (Cedar, Byers, Hutton, and Hall Creeks) was developed based on Groseclose Creek and then transferred to each individual watershed. This was done because there were no stream gages on the other waters. Groseclose Creek which is a similar watershed located just upstream from Cedar Creek, Hall/Byers Creek, and Hutton Creek. When the simulated data on Groseclose accurately reflected the observed flow data the model was considered complete and transferred to the other watersheds. The hydrologic parameters were adjusted to match the conditions in each watershed. The model was calibrated to the impaired watersheds (Cedar Creek, Hall/Byers Creek, and Hutton Creek) by comparing simulated flow results to observed flows (monthly samples).

EPA believes that using HSPF to model and allocate fecal coliform will ensure that the

designated uses and water quality standards will be attained and maintained for Hall and Byers Creek.

2) The TMDL includes a total allowable load as well as individual waste load allocations and load allocations.

Total Allowable Loads

Virginia indicates that the total allowable load of fecal coliform is the sum of the loads allocated to land based, precipitation driven nonpoint source areas (impervious areas, built-up area, distributed area, field crop, forest, hayfield, improved pasture, overgrazed pasture, poor pasture, row crop, strip crop), directly deposited nonpoint sources of fecal coliform (cattle in-stream and failed septic systems), and point sources (Emory-Meadowview Waste Water Treatment Plant (WWTP)). Activities such as the application of manure, fertilizer, and the direct deposition of wastes from grazing animals are considered fluxes to the land use categories. The actual value for the total fecal load can be found in Table 1 of this document. The total allowable load is calculated on an annual basis due to the nature of HSPF model.

Waste Load Allocations

Virginia has stated that there is one point sources discharging to Hall Creek, Emory-Meadowview WWTP. EPA regulations require that an approvable TMDL include individual WLAs for each point source. According to 40 CFR 122.44(d)(1)(vii)(B), "Effluent limits developed to protect a narrative water quality criterion, a numeric water quality criterion, or both, are consistent with assumptions and requirements of any available WLA for the discharge prepared by the State and approved by EPA pursuant to 40 CFR 130.7." Furthermore, EPA has authority to object to the issuance of any NPDES permit that is inconsistent with the WLAs established for that point source. The allocation plan for this watershed did not call for any reductions from the point source. The Waste Load Allocation was determined by multiplying the permitted discharge concentration by the daily flow. It should be noted that due to treatment technology, the point source is likely to be discharging fecal coliform at concentrations below its permitted limit. Table 2 illustrates the loading associated with this point source. The values in Table 2 are equivalent to the daily load, in order to determine the annual load please multiply the values in Table 2 by 365 days. The annual loading from this point source is 7.85 +E10 cfu/year.

Table 2 - Summarizes the WLAs for each point source

Point Source Name	Existing Load (cfu/day)	Allocated Load (cfu/day)	Percent Reduction
Emory-Meadowview WWTP	2.15×10^{8}	2.15×10^{8}	0%

Load Allocations

According to federal regulations at 40 CFR 130.2 (g), load allocations are best estimates of the loading, which may range form reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting loading. Wherever possible natural and nonpoint source loads should be distinguished.

In order to accurately simulate landscape processes and nonpoint source loadings, VA DEQ used the HSPF model to represent the Hall/Byers Creek watershed. The HSPF model is a comprehensive modeling system for simulation of watershed hydrology, point and nonpoint loadings, and receiving water quality for conventional pollutants and toxicant[4]. More specifically HSPF uses precipitation data for continuous and storm event simulation to determine total fecal loading to Hall/Byers Creek from impervious areas, built-up area, distributed area, field crop, forest, hayfield, improved pasture, overgrazed pasture, poor pasture, row crop, strip crop. The total land loading of fecal coliform is the result of the application of manure, direct deposition from cattle and wildlife (geese and deer) to the land, fecal coliform production from dogs, and best management practices which have already been implemented on several farms reduce the loading of fecal coliform and sediment to streams.

In addition, VADEQ recognizes the significant loading of fecal coliform from cattle in-stream and failed septic systems. These two sources are not dependent on a transport mechanism to reach a surface waterbody and therefore can impact water quality during low and high flow events.

It should be noted that an extensive amount of BMPs (Best Management Practices) have been implemented within Cedar Creek , Hall/Byers Creek, and Hutton Creek. BMPs have been installed in approximately 20% of the Byers/Hall Creek watershed. Based on the model these BMPs have reduced the fecal coliform loading by 15.1%.

There are three weather stations in the area around the study area. The closest weather station (Helton, NC) had a significantly larger annual rainfall average (53 inches) than the watershed in question. It was decided that the use of this watershed would bias the model toward regulating nonpoint sources (runoff related wastes) and therefore not used. The study area had a mean annual rainfall of 43 inches. Weather stations in Bristol and Wytheville were used because their mean annual rainfall (41 and 39 inches respectively) was closer to the annual rainfall of the study area. The watershed is located halfway between these weather stations. DEQ averaged the rainfall data from these two stations and applied the computed data to the model. This interpretation can affect the model because there maybe some differences between the actual storm event and the computed event. Table 3 illustrates the load allocation for the land application of fecal coliform.

[4] Supra, footnote 2.

Table 3 - Load allocation for the land application of fecal coliform

Source	Existing Load (cfu/yr)	Allocated Load (cfu/yr)	Percent Reduction
Impervious Areas	6.75E+13	6.75E+13	0%
Built-up Area	2.43E+12	2.43E+12	0%
Field Crop	9.80E+11	9.80E+11	0%
Forest	1.73E+12	1.73E+12	0%
Hayfield	1.00E+13	1.00E+13	0%
Improved Pasture	2.94E+14	2.94E+14	0%
Overgrazed Pasture	4.37E+14	4.37E+14	0%
Poor Pasture	1.16E+14	1.16E+14	0%
Row Crop	4.55E+13	4.55E+13	0%
Strip Crop	6.20E+12	6.20E+12	0%
Failed Septic Systems	1.32E+12	2.11E+10	98.4
Cattle In-Stream	5.38E+13	8.61E+11	98.4

3) The TMDL considers the impacts of background pollution.

Fecal coliform loads from deer and geese were considered background loading and were incorporated into the model. These sources had a fecal coliform loading rate of cfu/acre/day.

4) The TMDL considers critical environmental conditions.

EPA regulations at 40 CFR 130.7 (c)(1) require TMDLs to take into account critical conditions for stream flow, loading, and water quality parameters. The intent of this requirement is to ensure that the water quality of Hall/Byers Creek is protected during times when it is most vulnerable.

Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards[5]
. Critical conditions are a combination of environmental factors (e.g., flow, temperature, etc.), which have an acceptably low frequency of occurrence but when modeled to, insure that water quality standards will be met for the remainder of conditions. In specifying critical conditions in

[5]EPA memorandum regarding EPA Actions to Support High Quality TMDLs from Robert H. Wayland III, Director, Office of Wetlands, Oceans, and Watersheds to the Regional Management Division Directors, August 9, 1999.

$4.4x10^8$

the waterbody, an attempt is made to use a reasonable "worst-case" scenario condition. For example, stream analysis often uses a low-flow (7Q10) design condition because the ability of the waterbody to assimilate pollutants without exhibiting adverse impacts is at a minimum. Virginia's standards are designed to be applied during all flow events.

The sources of bacteria for these stream segments were a mixture of dry (direct sources) and wet (nonpoint loads) weather driven sources. Since the watershed is not dominated by one type of loading, there may be no single condition that is protective for all other conditions. The critical condition for Hall/Byers Creek was represented as a typical hydrologic year, with both dry and wet periods.

5) The TMDLs consider seasonal environmental variations.

Seasonal variations involve changes in stream flow as a result of hydrologic and climatological patterns. In the continental United States, seasonally high flow normally occurs during the colder period of winter and in early spring from snow melt and spring rain, while seasonally low flow typically occurs during the warmer summer and early fall drought periods. Consistent with our discussion regarding critical conditions, the HSPF model and TMDL analysis will effectively consider seasonal environmental variations.

6) The TMDLs include a margin of safety.

This requirement is intended to add a level of safety to the modeling process to account for any uncertainty. Margins of safety may be implicit, built into the modeling process by using conservative modeling assumptions, or explicit, taken as a percentage of the wasteload allocation, load allocation, or TMDL.

Virginia includes an explicit margin of safety by establishing the TMDL target water quality concentration for fecal coliform at 190 cfu/ 100mL, which is more stringent than Virginia's water quality standard of 200 cfu/100 mL. This would be considered an explicit 5% margin of safety.

7) The TMDLs have been subject to public participation.

This TMDL was subject to a number of public meetings. Three public meetings were held in Glade Spring. The meetings were held on November 09, 1999, January 27, 2000, and March, 2000 and were intended to address initial questions and concerns regarding outreach issues and the TMDL process.

The first public meeting was held on November 9, 1999 in Glade Spring and was announced in the Washington County News on October 27, 1999 and the Virginia Register on November 08, 1999. The second public meeting was announced in the Virginia Register on December 28, 1999, the Washington County News on January 19, 2000, and the Bristol Herald Courier on January 23, 2000. The March 30, 2000, public meeting was announced in the March

13, 2000 Virginia Register and the local papers. No written comments or responses were provided by VA DEQ with this submission.

8) There is a reasonable assurance that the TMDL can be met.

EPA requires that there be a reasonable assurance that the TMDL can be implemented. WLAs will be implemented through the NPDES permit process. According to 40 CFR 122.44(d)(1)(vii)(B), the effluent limitations for an NPDES permit must be consistent with the assumptions and requirements of any available WLA for the discharge prepared by the state and approved by EPA. Furthermore, EPA has authority to object to issuance of an NPDES permit that is inconsistent with WLAs established for that point source.

Nonpoint source controls to achieve LAs can be implemented through a number of existing programs such as Section 319 of the Clean Water Act, commonly referred to as the Nonpoint Source Program. Additionally, Virginia's Unified Watershed Assessment, an element of the Clean Water Action Plan, could provide assistance in implementing this TMDL.

ATTACHMENT 5

EPA Check Sheet

Revised 2/2003

State "Transmittal Checklist" to Assist in Targeting Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Hall Creek Wastewater Treatment Plant

NPDES Permit Number: VA0087378

Permit Writer Name: Fred M. Wyatt

Date: December 8, 2011

Major [ ] **Minor** [X] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit– entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?		X	
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?		X	
6. A Reasonable Potential analysis showing calculated WQBELs?			X
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?			X
9. Permit Rating Sheet for new or modified industrial facilties?			X

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet **or** permit contain a description of the wastewater treatment process?	X		

I.B. Permit/Facility Characteristics– cont.	Yes	No	N/A
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?	X		
6. Does the permit allow the discharge of new or increased loadings of any pollutants?	X		
7. Does the fact sheet **or** permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?	X		
a. Has a TMDL been developed and approved by EPA for the impaired water?	X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?	X		
10. Does the permit authorize discharges of storm water?		X	
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?	X		
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?		X	
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs

(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistentwith 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?		X	

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?	X		
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location wheremonitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?		X	

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?		X	
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?	X		

II.G. Standard Conditions	Yes	No	N/A
1. Does the **permit** contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

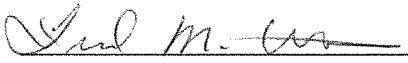
List of Standard Conditions – 40 CFR 122.41

Duty to comply
Duty to reapply
Need to halt or reduce activity not a defense
Duty to mitigate
Proper O & M
Permit actions
Property rights
Duty to provide information
Inspections and entry
Monitoring and records
Signatory requirement
Bypass
Upset
Reporting Requirements
Planned change
Anticipated noncompliance
Transfers
Monitoring reports
Compliance schedules
24-Hour reporting
Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Fred M. Wyatt
Title	Environmental Engineer Sr.
Signature	
Date	12/08/2011